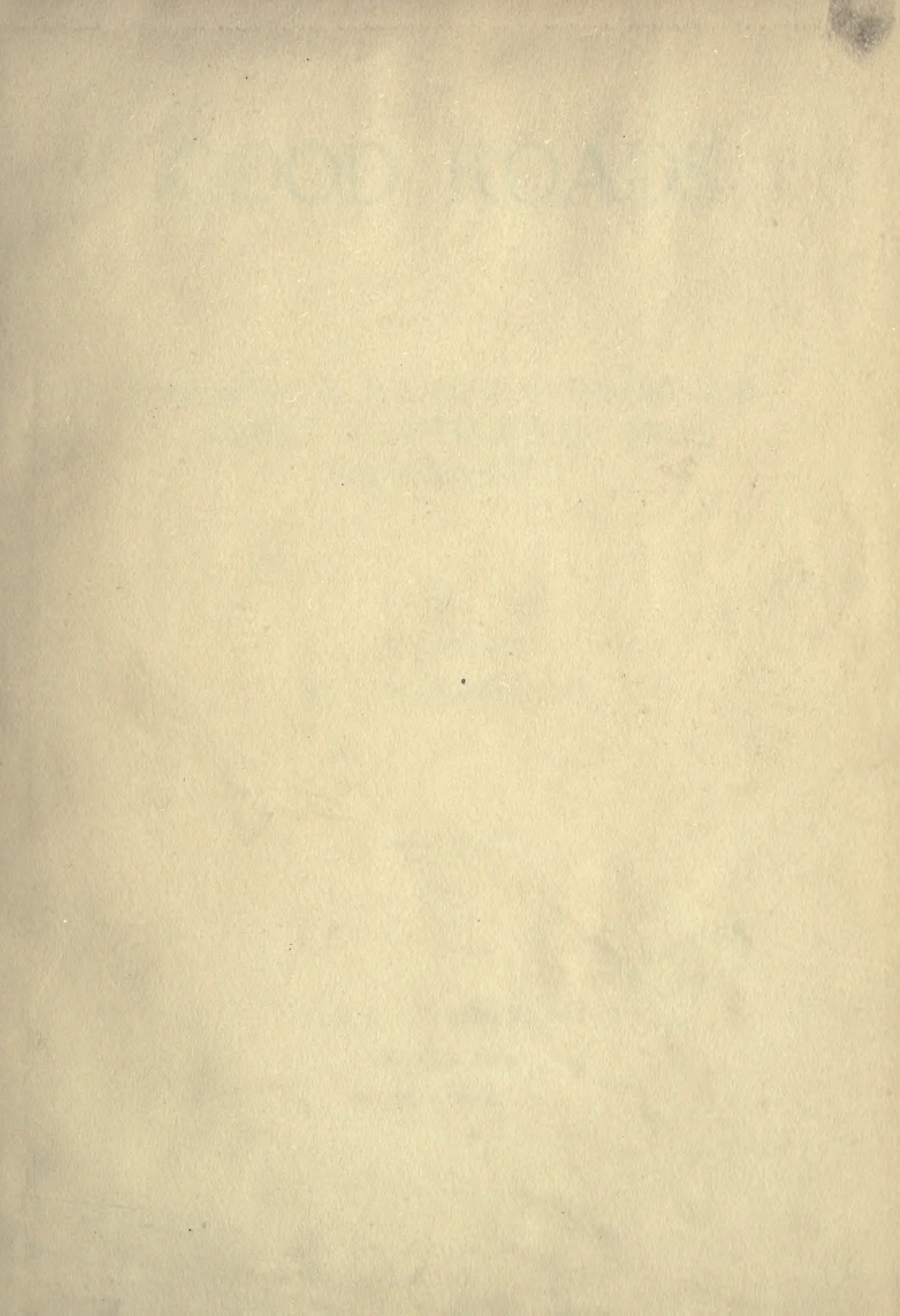


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GOOD ROADS

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Number
1

Experimental Pavements in the Borough of Queens, New York City

During 1911 several sections of experimental pavement were laid on Hillside Avenue, Jamaica, by the Borough of Queens, New York City. The work was in charge of a special committee appointed by Borough President Gresser, and was described briefly in a previous number of this journal. ["Experimental Pavements in The Borough of Queens," "Good Roads," October 7, 1911, p. 184.] The construction of the pavements has been made the subject of a report recently issued by the committee, and from that report, from a description of the pavements given by E. H. Thomes, of the Bureau of Highways of the Borough of Queens, at the special road meetings of the American Society of Civil Engineers in January of this year, and from other sources, the data on the construction of the sections contained in the following paragraphs have been taken.

The special committee in charge of the work was appointed on Sept. 28, 1910, and consists of Nelson P. Lewis, Chief Engineer, Board of Estimate and Apportionment, New York City, Chairman; Logan Waller Page, Director, U. S. Office of Public Roads; John M. Goodell, Editor, "Engineering Record," and John H. Weinberger, Engineer of

Highways, Borough of Queens. At a conference of the committee with Borough President Gresser, held a few days later, it was decided that the necessary preparations for the work would require so much time that the actual construction could not be undertaken until late in the year and that cold weather would prevent the securing of satisfactory and conclusive results. It was, therefore, decided to postpone the construction of the pavements until the summer of 1911, as it was believed that the best results in the construction of the types of pavements to be built could be secured only during warm weather. The carrying out of the work under favorable conditions was considered particularly essential in the case of experimental pavements by means of which it was hoped to demonstrate the relative merits of different types of construction.

The road chosen for the experiment is a section of Hillside Ave., 2,000 ft. in length, extending from the tracks of the New York & Queens County Street Railway, near Flushing Ave., to the Soldiers' Monument at Bergen Ave. In 1895, this section of road was surfaced to a width of 18 ft. with a 6-in. water bound trap rock macadam, on



EXPERIMENTAL PAVEMENTS ON HILLSIDE AVENUE, JAMAICA, L. I.—OIL-CEMENT-CONCRETE SECTION COVERED WITH BITUMINOUS CARPET.



EXPERIMENTAL PAVEMENTS AT JAMAICA, L. I.—OIL-CEMENT-CONCRETE SECTION UNDER CONSTRUCTION.



EXPERIMENTAL PAVEMENTS AT JAMAICA, L. I.—SPREADING BITUMINOUS CONCRETE—MIXING METHOD.

each side of which a 17-ft. gravel roadway with a 4-ft. brick gutter was put down. At about the same time, pipe sewers were also laid near the center of the street. Ten years later, in 1905, the street was scarified and resurfaced with water bound macadam to a width of 25 ft. The surfacing consisted of $2\frac{1}{2}$ -in. trap rock laid to a depth of 5 ins., loose measurement, partially filled with sand and bound with trap rock screenings. When the experimental work was commenced in 1911, the central portion of the road had worn down so that it was almost flat. The surface also showed a number of pot holes, some caused by the street openings that had been made from time to time and others by the wear of traffic.

The experimental work consisted of the construction of nine sections; one of oil-cement-concrete, four of bituminous concrete, and four of bituminous macadam, the term "bituminous concrete" being used to designate bituminous pavements laid by the mixing method, and the term "bituminous macadam" those laid by the penetration method. The oil-cement-concrete section was divided into two sub-sections by the use of different oils, and four of

the remaining eight sections were similarly divided by the use of different oils in the seal coats.

Before laying the experimental pavements, the entire road was scarified to a depth of about 3 ins., brought to a crown of about $\frac{3}{8}$ -in. per ft., with a road grader, and the shaping finished by hand. A course of $1\frac{1}{2}$ -in. stone, about $1\frac{1}{2}$ ins. deep, was then spread over the entire road, with the exception of section No. 1, and thoroughly rolled. Brick and granite block headers were placed at the sides of the first section, and a single course of cobblestones, varying in diameter from 3 ins. to 5 ins., was laid by hand to form a shoulder along most of the bituminous pavements.

Oil-Cement-Concrete

Experiment No. 1: Oil-Cement-Concrete Pavement.—The first experiment comprised the construction of an oil-cement-concrete pavement, extending from station 0 to station 1 + 73. On the subgrade, prepared by scarifying and rolling, was placed a single course of oil-cement-concrete, 4 ins. in thickness, consisting of an aggregate made up of Vulcanite Portland cement, sand and stone, in the



EXPERIMENTAL PAVEMENTS ON HILLSIDE AVENUE, JAMAICA, L. I.—BITUMINOUS CONCRETE SECTIONS—LOOKING WESTERLY FROM STATION 14 + 00



EXPERIMENTAL PAVEMENTS AT JAMAICA, L. I.—APPLYING FLUSH COAT BY MEANS OF DISTRIBUTING MACHINE.

proportion of 1:2:4 by volume, to which was added oil to an amount equal to 10 per cent. of the weight of the cement. The stone used was trap rock, ranging from $\frac{3}{4}$ -in. to $\frac{1}{4}$ -in. in diameter. The sand was clean, sharp sand, free from foreign matter and showing, when shaken with water, and after subsidence, not over 5 per cent. by volume of silt. The oil used in the section extending from station 0 to station 0+97 was that known as Standard Flux Oil for cement concrete work, and that from station 0+97 to 1+73 was Texaco Concrete Oil. The concrete was mixed by machine, dumped into wheelbarrows and placed on the road. It was then tamped with concrete tampers until thoroughly compacted and the water flushed to the surface, after which uneven places on the surface were filled with stone ranging from $\frac{1}{4}$ -in. to dust, and tamped. On the first $12\frac{1}{2}$ ft. of the section the concrete was covered with a coating, about $\frac{1}{4}$ -in. thick, of the smaller size stone, spread while the surface was wet. On the remainder of the section a mortar, consisting of 2 bags of cement, $2\frac{1}{2}$ cu. ft. of sand, $7\frac{1}{2}$ cu. ft. of screenings and 8 qts. of oil, was spread to a depth



EXPERIMENTAL PAVEMENTS AT JAMAICA, L. I.—MIXING PLANT FOR BITUMINOUS CONCRETE WORK.

of about $\frac{1}{2}$ in. The surface was kept damp by sprinkling with water for about a week, and no traffic was allowed on the road for about four weeks.

During May of this year the oil-cement-concrete section was covered with a bituminous coating, a number of depressions having formed in the pavement. After thoroughly brooming the surface the deeper depressions were mopped with tar-asphalt and partly filled with $\frac{3}{4}$ -in. stone. A coating of about $\frac{1}{2}$ in. in depth, composed of bituminous materials and fine aggregate, was then put on, the bitumen being applied by means of hand pouring pots at the rate of about $\frac{1}{2}$ gal. per sq. yd. Texaco 55 Paving Cement was used on part of the section and Tarvia mixed with about 15 per cent. of asphalt was used on all of the remainder with the exception of one short section where no surfacing was put on. Sand, trap rock screenings and chips were used as aggregate on different parts of the section.

Bituminous Concrete.

Experiments 2, 3, 4 and 5 comprised the construction



EXPERIMENTAL PAVEMENTS ON HILLSIDE AVENUE, JAMAICA, L. I.—BITUMINOUS MACADAM SECTIONS—LOOKING WESTERLY FROM STATION 15 + 50

of sections of bituminous bound broken stone pavements by the mixing method. All of these sections were built in accordance with a general specification designated as No. 2, applying to all bituminous concrete and bituminous macadam sections, and another general specification known as No. 3, applying to all bituminous concrete sections. Specification No. 2 covers the stone to be used, the equipment and general method of construction.

The stone used consisted of trap rock, broken into four sizes designated as follows:

Screenings.—That product of the crusher passing a $\frac{1}{2}$ -in. or $\frac{3}{4}$ -in. circular opening, including the dust of fracture.

$\frac{3}{4}$ -in. Stone.—Crushed rock passing a $1\frac{1}{8}$ -in. or $1\frac{1}{4}$ -in. opening but retained on a $\frac{1}{2}$ -in. or $\frac{3}{4}$ -in. opening.

$1\frac{1}{8}$ -in. Stone.—Crushed rock passing a $2\frac{1}{4}$ -in. opening but retained on a $1\frac{1}{8}$ -in. or $1\frac{1}{4}$ -in. opening.

$2\frac{1}{2}$ -in. Stone.—Crushed rock passing a $3\frac{1}{4}$ -in. opening but retained on a $2\frac{1}{4}$ -in. opening.

In addition to these, screenings which had been screened so as to remove practically all of the stone dust by passing over a $\frac{1}{4}$ -in. or $\frac{3}{8}$ -in. screen, were designated as $\frac{3}{8}$ -in. stone.

The construction of the bituminous wearing surfaces under the provisions of specification No. 3, was carried out as follows: The stone used was that designated as $\frac{3}{4}$ -in., and the bituminous materials those called for by the several different specifications prepared for each particular case. The bituminous materials were heated in a heating kettle to the temperature required in each particular case, and were then mixed with the stone in a mechanical mixer, from 18 to 21 gals. of the binder being used with each cubic yard of stone. The aggregate was taken from the mixer to the road in wheelbarrows and spread with rakes to the thickness necessary to reduce to 2 ins. under the rolling.

After the wearing surface had been rolled until the wheels of the roller failed to make creases, the surface was thoroughly cleaned and a flush coat of from $\frac{3}{4}$ to 1 gal. of bituminous material per sq. yd. applied to the surface. The heated material for the flush coat was then applied to the road and the surface covered with a thin layer of $\frac{3}{8}$ -in. stone.

The four experiments made were as follows:

Experiment No. 2: Cut-Back Oil Asphalt Mixed With Cold Stone.—Experiment No. 2 extended from station 1 + 97 to station 4 + 96, and consisted of the construction of an asphaltic concrete pavement in which Texaco Macadam Binder was used in the mixture. The material used in the seal coat on the first half was Texaco Macadam Binder and on the last half Texaco 55 Paving Cement.

Experiment No. 3: Fluxed Native Asphalt Mixed With Cold Stone.—Experiment No. 3 extended from station 4 + 96 to station 8 + 00, and consisted of the construction of a bituminous concrete using Bermudez Road Asphalt in both the mix and the seal coat.

Experiment No. 4: Refined Coal Tar Mixed With Cold Stone.—Experiment No. 4 consisted of the construction of two sections, the first extending from station 8 + 00 to station 9 + 50, and the second from station 9 + 50 to station 10 + 98. In both sections Tarvia X was used in the mixture, and in the seal coat Tarvia X was used on the first section and Texaco 55 Paving Cement on the second.

Experiment No. 5: Cut-Back Oil Asphalt Mixed With Cold Stone.—Experiment No. 5 consisted of the construction of a bituminous macadam pavement extending from station 10 + 98 to station 13 + 94. Standard Special Binder was used in both the mix and the seal coat.

Bituminous Macadam.

The experimental bituminous macadam work comprised the construction of four experimental sections—Nos. 6, 7,

8 and 9, with various bituminous binders by the penetration method. The work was performed in accordance with general specification No. 2 and with specification No. 4 for bituminous wearing surface. The bituminous material was heated in the same manner as for the bituminous concrete work, and the wearing surface was constructed as follows:

Upon the prepared foundation there was spread, to a depth of 3 ins., loose measurement, a single course of $1\frac{1}{2}$ -in. stone. This was rolled just enough to key together the fragments of stone so as to leave the course open to permit the penetration of the binder. The binder was then applied at the rate of about $1\frac{1}{2}$ gals. per sq. yd., immediately after which clean, dry $\frac{3}{8}$ -in. stone was spread over the surface in sufficient quantities to fill the surface voids. The road was then thoroughly rolled until solid, stone chips being added as necessary. The seal coat of hot bituminous material was afterwards applied at the rate of $\frac{3}{4}$ gal. per sq. yd., and the clean, dry $\frac{3}{8}$ -in. stone chips spread over the surface in sufficient quantity to take up all excess of bituminous material. The surface was then thoroughly rolled.

The experiments were as follows:

Experiment No. 6: Oil Asphalt, Penetration Method.—Experiment No. 6 extended in two sections, from station 13 + 94 to station 15 + 50, the first section extending to station 14 + 75. Texaco Road Asphalt was used as a binder in both sections. The seal coat on the first section was of Texaco 55 Paving Cement and on the second Texaco Road Asphalt.

Experiment No. 7: Refined Coal Tar, Penetration Method.—Experiment No. 7 extended from station 15 + 50 to station 17 + 00. Tarvia X was used both for the binder and for the seal coat.

Experiment No. 8: Fluxed Native Asphalt, Penetration Method.—Experiment No. 8 extended from station 17 + 00 to station 18 + 50, Bermudez Road Asphalt being used throughout.

Experiment No. 9: Oil Asphalt, Penetration Method.—Experiment No. 9 extended from station 18 + 50 to station 20 + 00, and consisted of the construction of an asphalt macadam pavement with Standard Binder B for both applications.

At the same time that the oil-cement-concrete section was resurfaced, a second seal coat was applied to the section between 8 + 00 and 9 + 50. The former seal coat had practically worn away during the winter, and while the surface remained in fair condition it was somewhat porous and further treatment was deemed desirable. From station 8 to station 8 + 70 a seal coat, consisting of about $\frac{1}{2}$ gal. per sq. yd. of Tarvia B, was applied, and from station 8 + 70 to 9 + 50 there was applied a seal coat of about the same amount as on the first section but composed of Tarvia with 15 per cent. of asphalt. The surface was then covered with sand.

The materials used in the construction of the bituminous concrete sections and in the oil-cement-concrete section were mixed in a No. 11 Smith Hot Mixer, manufactured by the T. L. Smith Co., Milwaukee, Wis. The binders used in the construction of sections 7, 8 and 9 and the materials used for the seal coats on sections 2, 7, 8 and 9 were applied by means of a "Good Roads" distributor, manufactured by the Good Roads Machinery Co., New York City. For the first application on section 6 and for the application of the seal coats on sections 3, 4, 5 and 6 "Perfection" pouring cans were used. The bituminous materials were heated in a 375-gal. heating kettle, manufactured by the Stevenson & Leonard Machine Co., Albany, N. Y. The steam roller, all labor, materials, small kettles, "Perfection" pouring cans and tools were furnished by the Borough of Queens, the labor being from the regular city forces.

The work was started on Aug. 7, 1911, and completed on Oct. 2, 1911, and was under the constant supervision

of E. H. Thomes of the Bureau of Highways of the Borough of Queens and James T. Voshell of the United States Office of Public Roads. In the planning of the work and the preparation of specifications for it, the committee was assisted by Prof. Arthur H. Blanchard and Prevost Hubbard, Consulting Engineer and Consulting Chemist, re-

spectively, to the Office of Public Roads, and by Mr. Thomes, of the Bureau of Highways.

Traffic censuses were taken on the road from Nov. 5 to Nov. 8, 1910, from Oct. 13 to Oct. 19, 1911, and from Oct. 29 to Nov. 4, 1911. The results are shown in tables I, II and III.

The report of the committee contains no data on the cost of the work. In regard to this, the committee makes the following statement:

"The work was entirely completed on October 2, 1911, and while the Committee has before it a statement of the unit prices and cost data, we defer submitting these data for the present, as we desire to review them and exclude therefrom certain charges for labor and machinery while the work was not in actual progress. In view of the circumstances under which this work was done and the limited amount of each kind of pavement laid, the cost will necessarily appear greater than it would if any considerable amount of pavements were to be laid by contract or with a suitable organization. We believe that with observations of future traffic and complete data as to the cost of maintenance and repairs for a term of years, some conclusions of value may be deduced as to the relative merits of the different types of construction employed."

When inspected on June 20, by a representative of "Good Roads," the pavement in each of the nine experimental sections was smooth and in good condition, and when examined casually little difference could be detected in the various surfaces. The coating applied this year to the oil-cement-concrete section has given it practically the same appearance as the other portions of the road, its surface being smooth and not at all sticky.

On the remaining sections, practically the only differences to be observed were that some were slightly more sticky and inclined to bleed than others, although none were soft enough to be objectionable because of tracking the binder. In general, the sections built by the penetration method were somewhat softer and more sticky and inclined to bleed than those built by the mixing method. Nearly all plainly showed the marks of traffic, but these apparently closed up leaving the surface smooth and fairly hard.

The inspection was made in the forenoon of a warm day, with the sun shining upon almost all of the road. The surface was free from dust except that brought from outside of the paved area, and was uniformly better at the center of the pavement than at the sides. This difference seemed to be due to the fact that most of the travel was over the sides of the pavement, its effect apparently being to draw the bituminous material in the pavement to the surface in much the same way as tamping concrete flushes the water to the top.

The pavements have, of course, been down for too short a time to permit the drawing of any definite conclusions as to their relative merits. It is expected that the committee will later render a progress report, in which such conclusions as can be drawn will probably be embodied.

TABLE I

Traffic Census on Hillside Ave., Jamaica; from 4 p. m., Sat., Nov. 4, to 4 p. m., Tues., Nov. 8, 1910.

	Nov. 5.	Nov. 6.	Nov. 7.	Average Nov. 8.	Per Day.
Loaded one-horse wagon.....	77	41	58	36	53
Unloaded one-horse wagon....	123	28	78	70	75
Loaded two-horse wagon.....	136	15	109	132	98
Unloaded two-horse wagon....	102	13	92	86	73
Loaded three-horse wagon.....	5	..	3	2	8
Unloaded three-horse wagon...	..	..	..	2	..
One-horse pleasure vehicle....	40	99	70	81	73
Two-horse pleasure vehicle....	1	11	3	11	7
Rubber-tired horse vehicle....	8	92	37	5	36
Saddle-horse	18	4	23	3	12
*Excessively heavy vehicle....	..	..	..	2	..
Motor runabout	30	76	42	25	43
Motor touring car.....	406	1,216	995	586	800
Loaded motor dray.....	34	3	27	34	25
Unloaded motor dray.....	6	..	11	7	6
Totals	986	1,598	1,548	1,082	1,304

*This is intended for very heavy vehicles, such as carry ore, stone, timber, machinery, etc.

Weather conditions:

Nov. 5—Rain until 11 p. m.

Nov. 6—Fair.

Nov. 7—Fair.

Nov. 8—Rain and snow 8 a. m. to 4 p. m.

TABLE II

Traffic Census on Hillside Ave., Jamaica; from 8 a. m., Fri., Oct. 13, to 8 a. m., Fri., Oct. 20, 1911.

	Oct. 13.	Oct. 14.	Oct. 15.	Oct. 16.	Oct. 17.	Oct. 18.	Average Oct. 19.	Per Day.
Loaded one-horse wagon	95	75	17	91	87	53	71	70
Unloaded one-horse wagon	84	61	3	55	69	49	61	54
Loaded two-horse wagon	58	57	7	76	91	55	59	57
Unloaded two-horse wagon	51	22	..	26	29	22	22	24
Loaded three-horse wagon	11	3	8	14	11	3	3	8
Unloaded three-horse wagon	2	2	..	3	4	1	..	2
One-horse pleasure vehicle	60	83	92	66	56	57	67	69
Two-horse pleasure vehicle	6	8	20	27	4	5	1	10
Motor cycle	50	55	136	37	31	..	8	45
Saddle-horse	14	19	8	21	20	5	9	14
Motor runabout	74	92	130	79	41	13	30	66
Motor touring	986	1,556	2,305	1,097	792	271	523	1,076
Loaded motor dray....	63	51	35	53	63	60	43	54
Unloaded motor dray....	21	27	20	25	20	22	20	22
*Motor delivery wagon	45	35	13	27	31	39	23	30
Totals	1,620	2,146	2,794	1,702	1,349	655	945	1,601

*A motor-wagon having a capacity of 1,500 pounds or less, used by stores for delivering small orders. In the census of 1910 a motor delivery wagon was tabulated as a motor dray.

Weather conditions:

Oct. 13—Fair.

Oct. 14—Fair, 8 a. m. to midnight.

Oct. 15—Cloudy, 1 a. m. to 8 a. m.; light rain, 120 p. m. to 6 p. m.

Oct. 16—Fair.

Oct. 17—Cloudy.

Oct. 18—Heavy rain.

Oct. 19—Light rain, 8 a. m. to 11 a. m.; cloudy and threatening, 11 a. m. to 8 a. m. on the 20th.

TABLE III

Traffic Census on Hillside Ave., Jamaica; from 11.30 a. m., Sun., Oct. 29, to 4.00 p. m., Sat., Nov. 4, 1911.

	Oct. 29.	Oct. 30.	Oct. 31.	Nov. 1.	Nov. 2.	Nov. 3.	Average Nov. 4.	Per Day.
Automobiles	5,544	5,808	1,524	798	695	248	128	2,106
Auto-trucks	89	12	48	50	48	24	13	41
Wagons	94	156	276	351	386	264	175	243
Motor-cycles	139	242	48	18	8	1	2	65
Coaches	10	132	18	48	51	29	25	45
Totals	5,876	6,350	1,914	1,265	1,188	566	343	2,500

Weather and traffic conditions:

Oct. 29, 30 and 31—Automobile traffic very heavy on account of aero meet at Belmont Park.

Nov. 1—Fair weather and normal traffic.

Nov. 2—Fair weather and normal traffic.

Nov. 3—Continuous heavy rain from 8 a. m. to 12 m.; traffic much below normal.

Nov. 4—Rain all day; travel below normal.

To Popularize Improved Roads

In order to make the citizens of Nashville, Tenn., familiar with the good roads of Davidson County, the good roads department of the Board of Trade of Nashville has arranged for a series of Saturday afternoon drives over the roads of the county. These drives will be under the supervision of Chas. C. Gilbert, Secretary-Treasurer of the Board of Trade.

People taking part in the drives are requested to take kodaks, and pictures will later be exhibited and prizes awarded for those possessing the most merit.

The Concrete Arch as a Highway Bridge

Concrete arch bridges were discussed at considerable length in a paper presented by Daniel B. Luten before the Bridge and Structural Section of the Western Society of Civil Engineers on June 10. Besides a somewhat detailed consideration of the design of concrete arch bridges, the paper included considerable general discussion of the advantages of this type of construction for highway bridge work.

According to Mr. Luten, the ideal highway bridge must include among its qualifications the following: (1) Permanency; (2) artistic appearance; (3) strength increasing with time; (4) safety, implying not only security but slow failure in case of defects; (5) stability even under unfavorable conditions; (6) effective waterway; (7) efficient and economical utilization of materials; (8) the employment of local labor and materials; (9) the providing of a continuous roadway over the bridge and approaches; (10) such design as to permit it to be easily widened; (11) an original design permitting subsequent modifications to be made easily, and (12) simplicity in design and erection.

Having stated these requirements, Mr. Luten proceeds to set forth the manner in which the concrete arch complies with each of them. In regard to permanence, he states that the concrete arch has all of the permanence of stone, and is, in fact, more permanent than the usual stone employed in building. In addition, he says that it has none of the limitations of steel, such as corrosion and crystallization, since the concrete is only slightly affected by the elements and the imbedded steel is protected from both moisture and vibration.

In regard to artistic appearance, Mr. Luten states that since the concrete arch displays an efficient use of material it presents a pleasing appearance. Since the fact that concrete is a material strong in compression is generally known, the unornamented arch appeals to the eye. As the form of the arch, when properly designed, is pleasing, all that is necessary to make it harmonize with its surroundings may be effected by the treatment of the details and by ornamentation.

For spans less than 100 ft., according to Mr. Luten, dignity of design can usually be best secured for an arch of moderate rise by using the earth filled type with solid spandrels. Semicircular arches, however, can rarely be made to present a satisfactory appearance with solid spandrels unless the depth of load over the crown be proportional to the rise, which is not an economical arrangement. For spans greater than 100 ft., he states, especially those with a great rise, the open spandrel construction is usually preferable, and at the present cost of labor and materials is usually economical also. It is extremely difficult to show by the external treatment of a concrete girder the presence of the steel that resists one-half of the stresses, and although appropriate paneling will partly accomplish it, this type of bridge, he holds, must always leave an impression of weakness, which cannot be removed by external treatment. The arch bridge, either of a single span or a series of arches, presents the best appearance, according to Mr. Luten, when cambered in a vertical parabolic curve having a rise of 1-150 of the entire length of the bridge, but not ordinarily exceeding 3 ft. This camber also provides for the surface drainage of the roadway.

Concrete arches, according to Mr. Luten, meet the requirement of increasing strength better than other material, because of the fact that concrete grows stronger with age, the increase amounting to, perhaps, 50 per cent. in the year following the first thirty days of the structure's life. The arch is superior to the girder in this respect, he states, because the girder, designed for equal efficiency of the steel and concrete, cannot gain any advantage through the increasing strength of the concrete except by overstressing the steel; while the concrete arch, since it depends for its strength principally upon the compressive strength of the concrete, does increase in strength as a structure as the concrete becomes stronger.

On the requirement of safety, by which is meant not only provision against ultimate failure, but also against sudden collapse, the concrete arch, according to Mr. Luten,



HORLICK PARK BRIDGE, RACINE, WIS.—SINGLE 65-FT. SPAN.—ILLUSTRATING PLEASING EFFECT OF CAMBER IN COPING AND RAIL.



RIPLEY BRIDGE, RIPLEY, N. Y.—ARCH SPAN 80 FT. IN LENGTH.



SEVENTEENTH STREET BRIDGE, BOULDER, COLO.—ARCH SPAN 70 FT.

is again superior to structures of other types, since it often gives indication of failure before any real danger exists. The failure of concrete arches, according to Mr. Luten is almost always caused by the yielding of the abutments or piers, which move slowly. The result is that cracks will develop which indicate weakness, while settlement may go on for months before actual failure takes place.

In considering the question of stability, Mr. Luten calls attention to the fact that while the concrete arch imposes a heavier load upon its foundations than does any other type of bridge yet the intensity of pressure may be made the same as for any other structure by properly spreading the footings, so that the heavier loading of the arch is objectionable only as it affects the cost. The excessive weight carried to the foundations by the concrete arch is due, of course, to the great weight of the bridge itself, and this greater load on the foundations is really an advantage, according to Mr. Luten, when the effects of moving loads on the structure are considered. While a heavy locomotive or other live load may increase the foundation pressures, under a steel trestle for instance, by several hundred per

cent., the corresponding increase under an earth covered arch of the same span seldom exceeds about 20 per cent., and the stresses in the latter structure are not seriously affected by an increase in the live load.

While concrete bridges are not seriously affected by the uniform settlement of one or both abutments, such settlement seldom is uniform and in this respect steel or wooden bridges have one great advantage over concrete since they can sustain unequal settlement of abutments or piers without serious damage. Even with unequal settlement, however, a concrete arch does not necessarily fail entirely, as is the case with a concrete girder. It is adjustable to unequal settlement, since the cracks produced in the arch ring may cause the material to act in much the same manner as the voussoirs of a masonry arch. In the case of arch bridges, cracks in the spandrel walls, according to Mr. Luten, are usually the worst results of uneven settlement, and they are merely symptoms indicating the condition of the structure. If, after a time, the settlement ceases, the cracks may be sealed or the spandrel walls may be removed and rebuilt with every chance of remaining free from



WHITE LICK BRIDGE, PLAINFIELD, IND.—55 FT. MIDDLE SPAN ON LIGHT PIERS 2 FT. 9 INS. THICK.—END SPAN 45 FT. IN LENGTH.



STEEL BRIDGE LODGED AGAINST 20-FT. CONCRETE ARCH AFTER FLOOD SUBMERGING LATTER.

cracks thereafter, so that slight unequal settlements in concrete arches are not necessarily serious.

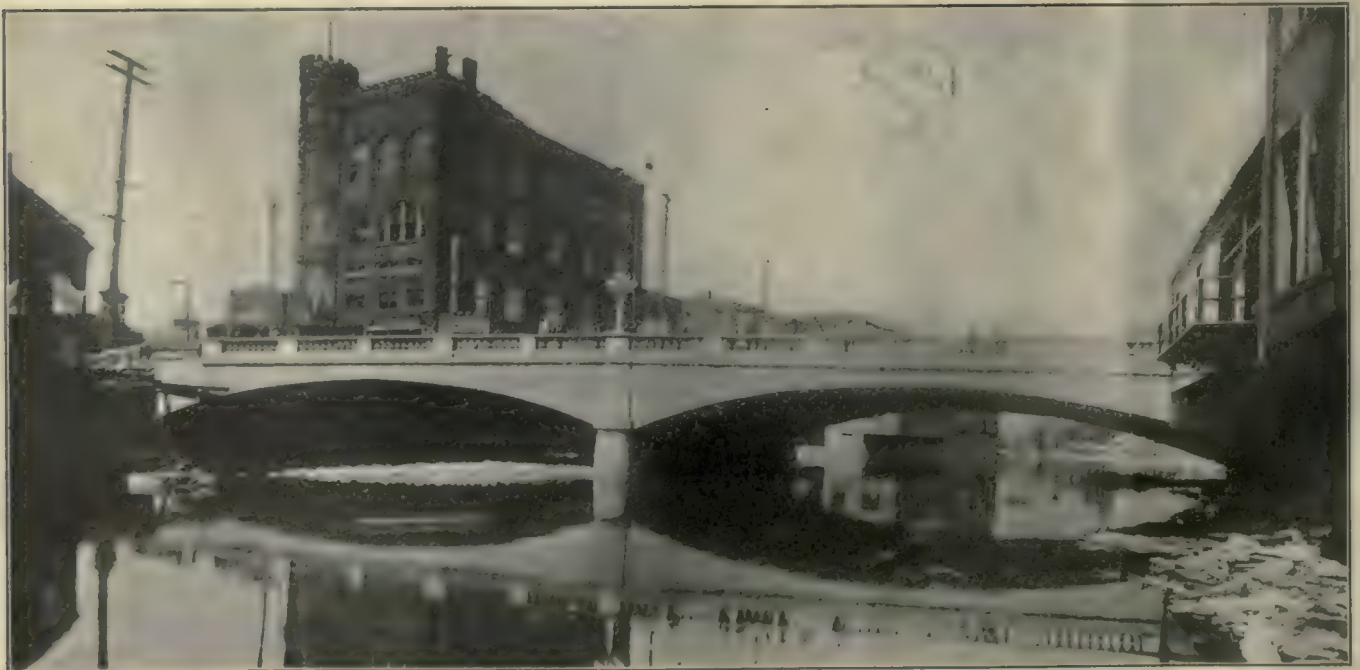
The introduction of hinges in concrete arches to provide for unequal settlement is absolutely useless, according to Mr. Luten. If the arch is a solid rib, hinges parallel to each other cannot relieve unequal settlement, and if it is made up of separate ribs, hinged separately at the crown or at the spring lines or both, the presence of the hinges may permit unequal settlement of the ribs and their supporting footings. But these ribs must support columns carrying a solid concrete floor, and any unequal settlement of the footings and ribs will necessarily cause an unequal settlement of the floor slab, which is, of course, incapable of withstanding it. The most useful purpose of a hinge in an arch, according to Mr. Luten, is to locate the thrust line and reduce a complex analysis to a simple calculation through the use of a complicated and expensive device in the actual construction. The use of the hinge in such an arch by an expert designer is rarely justified, he holds, and is an admission of inability to employ the elastic theory to make the necessary analysis of the proper arch ring.

The concrete arch, with its great mass, is also a desirable type of structure for a low level bridge subject to complete submergence, Mr. Luten states. In such cases, the roadway and approaches should be paved to prevent scour, and because of its tendency to float away a wood block pavement should not be used.

In discussing the subject of waterway, Mr. Luten takes up the three representative types of waterway, namely V-shaped, rectangular and inverted V, all of equal areas. The V-shaped opening, he says, is a desirable type for sewers where it is desired that a small flow of water produce a swift current in order to carry solids along a uniform channel. It is not suited, however, for bridge openings since it must dam back the water before adequate discharge capacity can be secured. It also requires a longer span for a given area of waterway. The inverted V-shaped opening provides the greatest span at the lowest level, and so will provide the greatest discharge at low levels and with the least damming effect, and while it requires a long span, it permits the use of the arch instead of the girder. The rectangular opening is intermediate between the other two in effective discharge. It has the advantage of a shorter span, but is limited to use with bridges of the girder type. From a consideration of these main points, and minor ones, Mr. Luten concludes that for the same area of waterway the arch bridge has a considerable advantage over bridges having the other forms of opening. For a given span and a fixed water level, however, this advantage no longer obtains.

Short span slab bridges with piers or column supports may provide a larger waterway area at a low cost by ignoring the obstructive effect of the supports, but for streams carrying debris, according to Mr. Luten, such bridges are suitable only for railroads having an organized track force available to prevent the lodgment of debris in time of flood.

In taking up the efficient and economical use of materials, Mr. Luten concludes that the concrete arch is the best type of bridge for locations where a rock foundation is available, because, in the arch, the stresses approximate very nearly uniform compression throughout. This advantage is not so marked, he states, when footings must be expanded to provide for soft foundations or insufficient back-



PITTSBURGH STREET BRIDGE, NEW CASTLE, PENN.—TWO 75-FT. SPANS—ILLUSTRATING USE OF ORNAMENTAL REINFORCED CONCRETE LAMP POSTS AND RAILS.

ing, although, even in such cases, the reinforced concrete arch will usually cost less than a concrete girder for the same requirements and for spans exceeding 20 or 30 ft.

The concrete girder, he states, is remarkably efficient in its use of material, although this deficiency is somewhat compensated for by the greater simplicity in form erection and the small amount of excavation required. The reasons given for the inefficient use of the material in this type of structure are that the portion of the concrete below the neutral axis of the slab and girder is useful only for the protection of the imbedded steel, and the concrete above the neutral axis, being stressed to the maximum only to the top at the middle of the span and falling to zero at all other extremes, but little more than one-eighth of the entire superstructure does full duty,

As meeting the requirement that home labor and materials be employed, the concrete arch, according to Mr. Lutten, surpasses all other forms. Practically the only bridge building materials which are available in a majority of communities are wood and the aggregate required for concrete, and even for wooden bridges of long span suitable timber often has to be imported. For wooden bridges and for steel bridges, therefore, almost all of the money required for the superstructure goes out of the county and usually out of the state. For concrete arches, he states, the only foreign expenditures that are necessary are that for the cement, amounting to 10 per cent. of the cost; that for the steel, amounting to 5 per cent., and 5 per cent. for superintendence, making a total of 20 per cent. The concrete girder entails foreign expenditures of 10 per cent. for cement, 25 per cent. for steel and 5 per cent. for superintendence, making a total of 40 per cent., which is twice that for the concrete arch. He concludes from these that unless the profit on the arch bridge exceeds 20 per cent. it is better policy for a community to let contracts for arches even to outside contractors than to award contracts for girders to local contractors, all other advantages being, of course, assumed equal. A similar comparison for steel bridges, he states, would exclude them altogether. As the span of a reinforced concrete arch is increased, he states, the percentage of steel required actually decreases, due to the fact that the steel reinforcement is required principally for live load stresses and is, therefore, proportionally less for



MERIDIAN STREET BRIDGE, INDIANAPOLIS, IND., DURING FLOOD—THREE 74-FT. SPANS.

the long, heavy span than for the short, lighter span because of the lesser relative effect of a concentrated load on a longer bridge. In many long span concrete bridges of 200 ft. or over, he states, there is no advantage in any arch reinforcement whatever, while if used indiscriminately, for instance in compression without suitable restraining stirrups, steel may actually weaken the structure.

The requirement that a continuous roadway be provided over the bridge and approaches is best met by an earth covered concrete arch, according to Mr. Lutten, since an earth, gravel, macadam or brick roadway may be extended entirely across the structure with no break whatever in its continuity. This is due to the fact that the material carrying the roadway over the bridge is the same as that supporting the roadway on the approach, and so will not cause holes at the joining of the two different pavements or differently supported pavements. An earth or gravel covering over a concrete deck is apt to show depressions after wet weather, according to Mr. Lutten, unless the material is more than 12 ins. thick; hence, the covering over an arch gradually reduces in depth to a desired minimum of from



FAIR GROUND'S BRIDGE AT DES MOINES, IOWA.—ILLUSTRATING ARTISTIC AND HARMONIOUS TREATMENT OF A 12-FT. ARCH BRIDGE.

8 to 12 ins. Temporary floors of plank or unprotected concrete should not be considered, except when made necessary by a shortage of funds, according to Mr. Luten, since in order to replace these floors with something more permanent it is usually necessary to entirely destroy the superstructure. It is also poor practice, he states, to lay a reinforced concrete floor as part of the structure and expect it later to serve as a foundation for the pavement, unless while used as a floor it is absolutely protected from wear, since the inspection of highway and city bridges is too lax to permit the taking of chances with such construction for the sake of the limited saving that will be realized.

The concrete arch, according to Mr. Luten, also has many advantages as regards ease of widening after it has been in service for some time. As time passes, it is frequently necessary to widen bridges to provide for increased traffic which could not have been foreseen or, if foreseen, would have involved excessive cost in the original construction of the bridge. Ordinarily through bridges of the girder or truss type can be widened only by the reconstruction of the superstructure. On the other hand, deck bridges and arches can be widened at any time without the loss of any of the original investment and at no extra cost beyond that of moving the rail and, perhaps, burying the spandrel walls in additional fill.

Another advantage claimed for the concrete arch is that the design may easily be modified to conform to improved surroundings. The necessity for increased width is often accompanied by a demand for a bridge of better appearance in order to conform to the surroundings. As an example of this, it may be that a concrete arch bridge has been erected with a narrow roadway, plain paneled railings, wing walls and a spade finish. At some future time, a wider roadway may be demanded and the widening of the roadway permits the new portions of the structure to be so built as to hide completely the original bridge by the erection of new spandrels. These may be finished by chiseling or bush hammering and surmounted with ornamental rails, light posts and other ornamentation, and the spandrels carried back of the abutments, replacing the less ornamental wings.

As to simplicity in design and erection, Mr. Luten states that while the reinforced concrete arch is far from ideal in the matter of analysis and is, perhaps, as difficult an engineering structure to deal with as has been devised, yet its erection is simple. The erection of centers and the placing of the reinforcement require only the ordinary skill of an average carpenter, according to Mr. Luten, and while the finishing requires skilled labor, unskilled labor may be used for the erection of a larger proportion of a concrete arch than of any other type of bridge.

In concluding his discussion of the advantages of the concrete arch, Mr. Luten states that from almost every standpoint, except that of simplicity in analysis, the concrete arch bridge excels in those qualities essential to an ideal highway bridge. The one objectionable feature, that of complicated analysis, can be removed, he states, by the standardization of arch designs, since when an arch has been once analyzed for a given span and rise and the structure properly designed, the same design will serve for other bridges with similar requirements and similar locations.

The remainder of Mr. Luten's paper is devoted to a discussion of design by the elastic theory, a comparison of results obtained by different analyses, a consideration of standard designs and patent protection for designs and a consideration of methods of letting.

In conclusion, Mr. Luten summarizes his paper as follows: "(1) The reinforced concrete arch approximates the ideal highway bridge; (2) its most serious drawback is the intricate method of analysis necessary for its solution; (3) this objection may be removed by development of standard designs; (4) standard designs require expensive analy-

sis as a basis, with confirmation by field inspection of behavior of actual structures; (5) patent protection on collateral improvements is essential to warrant production of standards; (6) present methods of conducting public lettings restrict opportunities for expert arch design; (7) the proposed remedy is a method of letting in which the plans show externals only, the structural details being submitted by the bidder conforming to detailed specifications."

Road Convention in Denver, Colorado

According to an announcement by the Colorado Good Roads Association, a convention is to be held in Denver some time during the last of August or the first of September of this year, in order to familiarize the people with the character of the two constitutional amendments relating to good roads, which will be voted upon at the state election in November.

In addition to these two amendments, it is proposed to initiate a bill relating to the Highway Commission and appropriating the internal revenue funds for distribution for state road purposes.

The announcement is to the effect that it is the plan of the good roads organizations of the state, in connection with the county commissioners of the various counties, to cooperate in preparing for and conducting the convention. Special efforts will be made to have candidates for state offices pledge themselves in favor of good roads legislation. It is probable that the convention will be held immediately preceding the primary election in September.

One of the amendments to be voted upon this fall provides for an appropriation of \$10,000,000 for state road purposes, \$1,000,000 to be issued each year.

The second amendment, known as the county enabling act, allows the counties of the state to issue bonds for the purpose of building roads, bridges and public buildings. Whether the highway bill will be initiated or not depends upon the securing of the necessary number of signatures to comply with the law.

It is reported that the county commissioners throughout the state, as well as the association, are against the presentation of this bill because of a doubt as to its legality. This doubt, it is claimed, will perhaps result in tying up of the road funds, thus delaying the work on the roads for another year or so.

Major Crosby Enters Private Practice

Major Walter Wilson Crosby, M.Am.Soc.C.E., who, as noted in previous issues of this journal, has resigned as Chief Engineer of the Maryland State Roads Commission, has established offices at 532 North Howard St., Baltimore, Md., and will hereafter engage in practice as a consulting engineer, though remaining Consulting Engineer to the Roads Commission.

Maj. Crosby has been prominently identified with road work in Maryland for nearly twelve years, serving during the last eight years as head of the state road work, first as Chief Engineer of the Geological Survey and later as Chief Engineer of the State Roads Commission. During that time he has had supervision of the preparation of plans, estimates and specifications for work entailing an expenditure of over \$10,000,000, of which \$8,000,000 worth has been completed. Although a large part of the work has been the building of country roads, Maj. Crosby has also had charge of city street work amounting to nearly \$2,000,000, the construction of bridges and other work.

Major Crosby is Chief Engineer of the Maryland Geological Survey, a member of the American Society of Civil Engineers, of the American Society of Municipal Improvements, of the International Association for Testing Materials, of the Association Internationale Permanente des Congres de la Route, and of other similar organizations.

New Specifications of the Association for Standardizing Paving Specifications—II.

In the issue of June 1 there were printed the new specifications of the Association for Standardizing Paving Specifications for bonds and guarantees, cement and concrete paving, stone block paving, brick pavements and wood block pavements. In accordance with the statement made editorially in that same issue, the remaining specifications, those for asphalt, bituminous concrete and macadam pavements, are printed in this issue.

As last month, only those portions of the specifications which are new are reprinted in full, since all the specifications were printed in their entirety in the issues of June and July, 1911. Wherever the specifications are quoted in the following paragraphs, the extracts are reprinted from the copyrighted proceedings of the Association for Standardizing Paving Specifications by permission of the association, John B. Hittell, Secretary and Treasurer, 5917 Winthrop Ave., Chicago, Ill.

ASPHALT PAVING SPECIFICATIONS

The report of the committee on asphalt in 1911 included specifications for asphalt pavements, for the manufacture of asphalt blocks and for wearing surfaces of bituminous rock and rock asphalt. This year the report includes only specifications for sheet asphalt, in explanation of which the committee makes the following statement:

Because the use of asphalt blocks and rock asphalt is local, rather than general, your committee does not feel that it should provide specifications to cover these materials at this time, and has, therefore, withdrawn from its report of 1911 that part relating to asphalt blocks and rock asphalt. We would not hesitate to admit their use under expert advice, as these materials have been successful in certain localities.

In regard to the specifications presented, the committee reports:

Your committee has attempted no radical changes in the specifications adopted by the last convention, but has endeavored to make our recommendations more clear and specific.

The committee has given special consideration to the suggestions and criticisms submitted by the members of the committee and others prior to the meeting, and has also considered the specifications adopted by the American Society of Municipal Improvements, at their recent meeting at Grand Rapids, Mich.

Representatives of various companies interested in the production and sale of bituminous materials were invited to appear before the committee, and their criticisms of our specifications and suggestions were asked for and were given earnest consideration.

Our conclusions were arrived at after discussion in open meeting and the consideration of all information available.

We found it difficult to make specifications broad enough to cover all the climatic and local conditions in the large territory represented by this body.

Certain asphaltic cements of low ductility or high penetration which have produced successful pavements would not be admitted under these specifications, and your committee would suggest that their use be permissible and advisable only when used under expert advice and when within the following limitations:

(a) Asphaltic cements having a maximum penetration of 100.

(b) Asphaltic cements not varying more than 125 in penetration between 32° F. and 115° F. and having a ductility of not less than 6 cm. at 77° F. and not less than 2 cm. at 32° F.

In the use of asphalts and asphaltic cements of unknown quality and composition, the development of which has been very rapid, your committee advises the greatest practicable acquaintance with the method of distillation, refining and production.

The members of the committee were as follows: George W. Tonson, Chairman, Chief Engineer, Department of Public Service, Toledo, Ohio; Clayton F. Smith, Member Board of Local Improvements, Chicago, Ill.; Otto H. Klein,

Director, Standard Testing Laboratory of the City of New York; C. E. P. Babcock, First Assistant Engineer, Buffalo, N. Y.; Felix Kleeberg, Chemist, Bureau of Highways, Borough of Manhattan, New York City; F. N. Bingham, City Chemist, Spokane, Wash.; Adam Wirth, Chemist, Municipal Repair Plant, New Orleans, La.; W. L. Hempelmann, Engineer of Bituminous Roadways, St. Louis, Mo.; George L. Campen, Assistant City Engineer, Omaha, Neb.

Refined Asphalt.—Slight changes have been made in the specification for refined asphalt, most of them being of minor importance. The provision that the asphalts to be used for the paving mixtures specified may be derived "by the careful distillation of asphalt petroleum with the aid of steam until the resulting bitumen has a consistency not harder than 40 penetration at 77° F." has been changed to read "by the careful distillation of asphaltic petroleum with continuous agitation until the resulting bitumen has a consistency not harder than 30 penetration at 77° F."

The paragraph providing that ten samples taken at random from each lot of material shipped shall not vary more than 15 per cent. from the average penetration has been modified by the addition of the clause, "providing no part of any shipment shall be below 30 penetration at 77° F."

A change has also been made in the paragraph relating to the ductility of the bitumen. The 1911 specification provided that a briquette of the solid bitumen having a cross section of 1 sq. cm. should have a ductility of not less than 30 cm. at 77° F., the material being elongated at the rate of 5 cm. per minute (Dow moulds).

The new specification reads as follows:

The solid bitumen at a penetration of 50 shall have a ductility of not less than 20 cm. nor more than 85 cm. at 77° F. If the penetration varies from 50 an increase of at least 2 cm. in ductility will be required for each 5 points in penetration above 50, and a corresponding allowance will be made below 50 penetration. This test shall be made with a briquette of cross section of 1 sq. cm., the material being elongated at the rate of 5 cm. per minute. (Dow moulds.)

Asphaltic Cement.—The next change of any importance in the specifications is in that portion of the specifications relating to asphaltic cement. The 1911 specifications provided that the asphaltic cement should have a penetration of from 40 to 100, the penetration to vary within these limits according to the particular use to which the asphaltic cement should be put. In the 1912 specifications the upper limit of penetration is reduced to 75.

The paragraph relating to the elongation of a briquette of the pure bitumen of the asphaltic cement has also been changed. The 1911 specifications provided that "a briquette of the pure bitumen of the asphalt cement of the penetration to be used in the paving mixture, having a cross section of 1 sq. cm., should elongate to the extent of not less than 10 cm. at 77° F." The 1912 specifications read as follows:

A briquette of the asphaltic cement when at a penetration of 50 having a cross section of 1 sq. cm. shall elongate to the extent of not less than 20 cm., nor more than 85 cm. at 77° F. If the asphaltic cement as used in the paving mixture varies from 50 penetration, an increase of at least 2 cms. in ductility will be required for each 5 points in penetration above 50, and a corresponding allowance will be made below 50 penetration. (Dow Moulds.)

Asphaltic Surface Mixture or Wearing Course.—In the 1911 specifications the committee presented specifications for two different mixtures for the wearing surface, one

having Portland cement as a filler and the other stone dust. In the 1912 specifications, only one mixture is specified, this one specification covering the use of either Portland cement or stone dust. This mixture is to contain the various ingredients in the following proportions:

	Per cent.
Bitumen soluble in cold carbon disulphide.....	9.5 to 13.5
Portland cement or stone dust passing a No. 200 sieve.....	10.0 to 15.0
Sand passing a No. 80 sieve.....	18.0 to 36.0
Sand passing a No. 40 sieve.....	30.0 to 50.0
Sand passing a No. 10 sieve.....	8.0 to 25.0
Sand passing a No. 4 sieve.....	up to 10.0

Wearing Surface.—A slight change has been made in the specification for laying the wearing surface. The 1911 specification provided that the asphalt wearing surface should be hauled to the work in wagons, provided with suitable covers, and that it should leave the plant at a temperature between 250° F. and 325° F. In the 1912 specification, the requirements are that the asphalt wearing surface shall be hauled to the work in wagons, as above, and as placed in the street shall have a minimum temperature of from 250° F. to 280° F.

Requirements as to Condition of Pavement at Expiration of Guarantee.—This section of the specifications has been changed by the insertion of one new requirement, which is as follows:

All settlements of surface of the pavement holding water, or other settlements showing a variation in elevation of $\frac{3}{8}$ in. or more from the edge of a 2-ft. straight-edge, must be brought to conform to the true crown and grade of the pavement.

BITUMINOUS CONCRETE

The report of the committee on bituminous concrete paving specifications, as last year, begins with the statement as to the meaning of the terms "bituminous concrete" and "bituminous macadam." It is stated that the understanding of the committee is that the term "bituminous concrete" is properly applied to any mixture suitable for paving purposes, composed of broken stone, sand and bituminous cement, mixed together before being laid, and then laid in a plastic condition. If the stone is spread in place and the bituminous cement or binder applied afterward, the resulting product is considered bituminous macadam.

In regard to the use of bituminous concrete, it is stated that it is the belief of the committee that "it may be successfully used as a paving material under a great variety of conditions and traffic; that it is adapted to use on a standard concrete base and on a well constructed macadam base, either new or old, and, therefore, finds an especial field in providing a permanent wearing surface for old macadam."

The remainder of the committee's comment on the specifications presented is as follows:

Your committee does not consider that the following specifications should be used in their entirety exactly as written in any case, as the effort has been made to produce specifications general in character which may be adapted to varying conditions of traffic. Thus the extreme range of penetration for asphaltic cement has been made from 40 to 80, which is too wide a range to admit for any particular case. A penetration of 40 will give a hard and stable pavement, while 80 will give a pavement too soft for heavily traveled streets. The choice should be made to meet conditions and the specifications applying to any particular case drawn closer within the limits named for penetration, working temperatures, etc. The engineer in charge should secure complete reliable analyses from chemists making a specialty of bituminous cements, of the cements he contemplates using, and compare them on all important points, not considering that because a cement comes within the limit named herein he is securing the best.

Asphaltic cements made from both natural and manufactured asphalts come within the requirements of the following specifications.

Your committee has prepared two specifications, designated for convenience as "Specification X" and "Specification Y."

Specification X is a revision of the specification adopted at the New York convention and provides for a one-layer pavement.

Specification Y is offered to this association for the first time and provides for a two-layer pavement consisting of a binder course and wearing surface.

The first one, Specification X, may be said to conform more closely to the technical definition of a concrete, while the second one, Specification Y, partakes somewhat of the nature of sheet asphalt construction in that a binder course and finer aggregate in the wearing surface are provided. Your committee, however, considers it is justified in offering Specification Y in the class of bituminous concrete.

It is not attempted by your committee to pass upon the validity of certain patents that have been issued for pavements, and the various municipalities that may adopt Specification X are advised to determine their own policies as to the recognition of these patents.

Specification Y, however, your committee believes provides for a construction about which there can be no question raised of patent infringement.

The committee consisted of the following: Linn White, Chairman, Engineer, South Park Commissioners, Chicago, Ill.; J. H. Weatherford, City Engineer, Memphis, Tenn.; Fred Gabelman, Engineer, Board of Park Commissioners, Kansas City, Mo.; William H. Connell, Assistant Commissioner of Public Works, Borough of the Bronx, New York City; A. C. Schrader, Superintendent and Engineer, West Chicago Park Commissioners, Chicago, Ill.

Specification X

Subgrade.—The contractor will be required to do all of the grading necessary to bring the surface to the proper subgrade as determined by the lines and grades given by the engineer. If the material at subgrade shall be of an unstable character and unfit for foundation, the contractor shall make such additional excavation as may be determined by the engineer and refill with approved material. After all necessary grading has been done to bring the surface to subgrade, the street shall be thoroughly rolled with an approved road roller, weighing not less than 10 tons. If settlement occurs the depression shall be filled and then rerolled until the surface is solid, uniform and parallel with the grade and cross section of the finished pavement. All filling shall be free from animal or vegetable matter and of a character approved by the engineer. In cases of spongy or yielding subgrade some other means besides ordinary rolling and sprinkling must be employed to obtain satisfactory compaction of the subgrade. In the case of loose, sandy soils, a small amount of cinders, gravel or fine crushed stone spread over the surface will often put it in a condition to be compacted under the roller. In the case of clay soils that puddle up or creep under continued rolling it is best to roll as dry as possible and be sparing in the use of water when rolling the first layer of macadam. Cinders, gravel or stone screenings will often help in rolling such subgrades.

Subdrainage.—When the soil is of such a character that it retains an excessive amount of moisture, such as clay subject to swelling or heaving under the action of frost, or sands similar to quicksand that do not afford a ready natural drainage, subdrains should be provided.

These may be of two general kinds, first, tile drains of open porous material or vitrified tile laid with open joints; second, trenches filled with broken stone, gravel, cinders or other similar material.

In some cases it may be sufficient to construct a subdrain on each side of the roadway at or near the lines of the gutters, but when the soil is of a very wet nature, it may be advisable to lay additional lines of drains which may be in or near the middle of the roadway. This system of drains may be varied by diagonal lines of drains running from near the crown of the roadway to the gutters.

In all cases the drains should have connections with the existing sewers, catch basins or inlets.

New Macadam Foundation.—If the pavement is to be laid on a new macadam foundation, the macadam shall be built as follows:

The total thickness of the macadam base will vary according to character of soil, drainage, kind of stone available, etc. In general, the macadam base should be constructed of broken stone which is sound, hard and durable under traffic. The broken stone should be separated into different sizes by screening, the smaller sizes with the dust being used to fill and bond together the larger sizes. The thickness of the base should be regulated by experience in constructing ordinary water bound macadam roads in similar situations, the total

thickness of pavement, including wearing surface, being made the same or a little less than well constructed macadam.

After the subgrade has been properly prepared, spread a layer of clean stone passing a 3 to 3½-in. revolving screen and held on a 2-in. screen to a depth sufficient when thoroughly rolled to form about two-thirds of the total thickness of the base. The thickness of this layer should be regulated by laying on the subgrade at proper intervals cubical blocks of wood of the proper dimensions to give the desired thickness. Over this layer of stone, spread with shovels stone screenings in sufficient quantity to fill the voids between the larger stone. The screenings should be spread gradually and thoroughly rolled with a road roller weighing at least 10 tons during the process of spreading the screenings. As the screenings are worked into the coarse stone under the roller more should be added here and there where voids appear. At first the rolling should be done dry until the stone appears to be well filled, then the surface should be well sprinkled and again rolled, the rolling and sprinkling continued until the layer of stone is thoroughly compacted and no more screenings can be forced in. Just enough screenings shall be used to fill and bond the stone, leaving no surplus screenings on the top.

The above method may be varied by using the crusher run of stone without the addition of any other filler where the small sizes are not in excess. Also a filler other than stone screenings, such as bank gravel or sand, may be used in some cases where experience with the materials available shows better results can be obtained. Under some conditions the character of soil and stone available may be such as not to require the use of any filler with the stone of the first course. The specifications given, however, represent the best average practice where stone with bonding value, such as limestone or trap rock, can be obtained.

When the first layer of macadam is completed as specified, spread a second layer of clean stone passing a 2 or 2½-in. screen and held on a 1-in. screen to a depth sufficient when thoroughly rolled to form the remaining one-third of the total thickness of the base. Over this layer of stone spread evenly with shovels stone screenings and roll with the application of water by sprinkling until the layer of stone is well bonded and firmly set in place. Just enough filler should be used to accomplish this purpose and not enough to form a layer or film over the surface of the stone. It is better not to fill the stone quite flush, leaving the coarse particles of stone slightly projecting, so as to have a coarse, grainy base, upon which to put the wearing surface.

The thickness of the pavement, including base and wearing surface, should vary according to local conditions and should be fixed by the engineer in charge when all the varying conditions of soil, drainage, traffic and materials of construction are understood. In general, a thickness of macadam base of 8 ins. with a wearing surface of 2 ins. will be enough for any except the most adverse conditions, and a base of 4 to 4½ ins. with a wearing surface of from 1½ to 2 ins. will meet the most favorable conditions of firm, unyielding soils and light traffic.

Old Macadam Foundation.—The portion of the specifications under this head is practically the same as in 1911, except that the following clause, which appeared in the former specifications, is omitted this year:

It is not practicable to pour an old macadam base with a bituminous filler unless a complete new surface of stone is provided, in which case it may be treated as specified for new macadam.

Wearing Surface.—A slight change has been made in the section of the specifications relating to the wearing surface. The last clause in the section in the 1911 specifications read as follows:

For moderate and light traffic, 1½ ins., or for light traffic, 1 in., will be sufficient thickness for the wearing surface when laid on a well constructed macadam base, as specified above.

The 1912 specification reads as follows:

For moderate and light traffic, 1½ ins. will be sufficient thickness for the wearing surface when laid on a well constructed base, as specified above.

Mineral Aggregate.—A change has been made in the specification for mineral aggregate by the omission of a portion of the 1911 specifications. The clause relating to size in the 1911 specification reads as follows:

The stone shall vary in size from a maximum of about half the thickness of the wearing surface to the smallest particle

retained on the finest mesh screen commonly used in crushing plants. That is, the minimum screen should be ¼ in. for dry stone and ½ in. for wet stone. For a 2-in. wearing surface, the stone would vary in size from that passing a 1½-in. screen to as small as that held on a ¼-in., and for a 1-in. wearing surface from that passing a ¾-in. screen down to the same minimum.

In the 1912 specification, everything has been omitted beginning with the words "for a 2-in. wearing surface the stone would vary in size."

Asphaltic Cement.—The principal change in the specification for asphaltic cement is in those portions relating to penetration. In the 1911 specification the first requirement for the asphaltic cement was the following:

(1) It shall have a penetration of from 40 to 65 at 77° F. for use on streets where there is much heavy traffic and where it is desired to have a hard, exceedingly stable pavement. The penetration shall be from 50 to 100 at 77° F. for use on streets or roadways where the traffic is medium and where a resilient, non-slippery pavement is an important consideration. (The above penetrations are measured in hundredth centimeters with a No. 2 needle weighted with 100 grams acting for 5 secs.)

The corresponding clause of the 1912 specification reads as follows:

(1) It shall have a penetration of from 40 to 80 at 77° F., depending upon the traffic conditions and hardness of the pavement desired. A penetration of from 40 to 50 in most cements will produce a hard, exceedingly stable pavement which should be used on streets subjected to constant or heavy traffic.

A penetration of from 50 to 65 in most cements will produce a pavement best calculated to meet general traffic conditions, while a cement with penetration of from 65 to 80 will be well suited for use on streets or roadways where the traffic is medium and where resiliency and non-slipperiness are important considerations. The above penetrations are measured in hundredths centimeters with a No. 2 needle weighted with 100 grams acting for 5 seconds.

The same change has been made in the upper limit of penetration in the third requirement, which, in the 1911 specification, was that upon ignition the bitumen of the asphaltic cement should yield not more than 15 per cent. of fixed carbon for asphaltic cement of penetration between 65 and 100 and not more than 16½ per cent. for asphaltic cement between 40 and 65. The 1912 specification is the same on this point, except that the upper limit of penetration is 80 instead of 100.

Coal Tar Cement.—Considerable change has been made in this specification, the new specification being as follows:

The coal tar cement shall be residue of the distillation of coal tar only, and shall be refined for the special purpose of making a paving cement.

No mixture of hard pitch with the lighter oils of coal tar will be permitted.

Its specific gravity shall be not less than 1.20 nor more than 1.29 at 60° F.

The melting point determined by the cube method shall be not less than 105° F. and not more than 115° F.

It shall contain not less than 15 per cent. nor more than 30 per cent. of free carbon insoluble in benzol.

It shall be free from water as determined by distillation and shall show upon ignition not more than ¼ per cent. of inorganic matter.

No distillate shall be obtained lower than 338° F. and up to 600° not less than 5 per cent. and not more than 20 per cent. of distillate shall be obtained. The distillate shall be of a gravity of not less than 1.03 at 60° F. In making this distillation an 8-oz. glass retort shall be used and the thermometer suspended so that before applying the heat the bulb of the thermometer is ½ in. above the surface of the liquid. The melting point of the pitch shall be determined by suspending a ½-in. cube in a beaker of water 1 in. above the bottom. The temperature shall be raised 9° per minute from 60° F. The temperature recorded the instant the pitch touches the bottom shall be considered the melting point of the pitch. In testing the original materials the initial temperature shall be 40° F.

Note: Water gas tar has been used with success in some bituminous pavements, but your committee does not consider it has sufficient information before it to prepare a specification for a water gas tar cement.

Surface Finish.—One other point in which Specification "X" differs materially from the specifications of 1911 is in the section devoted to surface finish. The change made is in the next to the last paragraph of the section which states the method to be employed in the case of park drives and roadways not subjected to heavy, constant traffic and where more grainy and coarser surface is desired. The change made consists in providing that torpedo sand or dry stone chips may be used, instead of specifying only dry stone chips as in 1911.

Specification Y

Specification Y, being entirely new, is reprinted in full:

Macadam Base.—The macadam base shall be constructed according to the specifications for macadam base under Specification "X," except that the upper layer of macadam shall be thoroughly filled flush to the top of the coarse particles of stone, leaving a small surplus of screenings in some cases, so the surface may be practically smooth. As this specification provides for a binder course and wearing surface which in most cases will, taken together, be thicker than the one-layer pavement called for under Specification "X," the macadam base may be made correspondingly thinner so that the total thickness of the completed pavement, including base, will be the same under similar conditions.

Concrete Base.—If a Portland cement concrete foundation is desired, it should be laid according to the standard specifications for concrete foundation prepared by the Committee on Cement and Concrete Paving Specifications and adopted by this Association.

Pavement.—The pavement shall consist of two courses, a binder course and a wearing surface.

Binder Course.—The binder course for macadam base shall be composed of a layer of coarse, clean stone of a size to pass a 2 or 2½-in. ring and be retained on a 1-in. ring. It shall be evenly distributed over the surface of the macadam base described above, 1½ ins. or practically only one stone deep and rolled until the stones are practically level and forced partially into the macadam base. The rolling should be comparatively light, only enough to partially embed the stone and set them firmly in place without crushing them or forcing the fine material up from below to completely fill the voids. This rolling should be done while the macadam base is still moist and comparatively soft. The stone of the binder course may be laid (1) without any coating or application whatever, (2) with an application of light bitumen after laying and rolling, or (3) coated with a bituminous cement before being laid.

If an application of oil is used, it should preferably be a petroleum distillate of about 18° to 20° Baume. Its purpose is to saturate the film of dust that may be on the surface of the stone and increase the adhesion and bond of the wearing surface to the stone of the binder course. It should be used in just sufficient quantity to cover the surface of the stone, leaving no appreciable surplus to be taken up by the paving material. If an application of tar is made it should be of a light consistency, flowing and penetrating readily at ordinary atmospheric temperatures.

If the stone is coated with a bituminous cement before being laid it shall be done by heating the stone and the cement and mixing while hot. Just enough cement shall be used to coat the stone thoroughly. The cement should be a bituminous cement of the same character and consistency as the cement used in the wearing surface.

If a concrete base is used the binder course shall be laid as called for under the standard specifications for sheet asphalt pavements or omitted entirely and the surface of the concrete base covered with a paint coat of bituminous cement of the proper consistency applied hot.

Wearing Surface.—The wearing surface shall consist of a paving composition of bituminous cement and mineral aggregate spread evenly and rolled into the binder course.

Mineral Aggregate.—The mineral aggregate shall consist of any suitable mineral matter, either sand or fine crushed stone, or a combination of both, varying in size from 0.1 in. down to dust passing a screen with 200 meshes to the inch, the grading to be similar to sheet asphalt mixtures. To this fine graded aggregate shall be added a proportion of crushed stone, all of which will pass a ½ to ¾-in. screen and be retained on a ¾ to 1-in. screen amounting to approximately 25 per cent. of the whole aggregate.

Bituminous Cement.—To the mineral aggregate shall be added from 8 to 10 per cent., by weight, of bituminous cement of the grades provided in the previously written Specification X.

Mixing and Laying.—The mixing and laying shall be done as

provided in the previously written Specification X, except that no seal or flush coat shall be used.

Note: Your committee had under consideration a type of pavement which has been laid in some localities, consisting of a Portland cement base with a very thin tar cement wearing surface, but owing to lack of definite information has not thought proper to offer a specification therefor.

Maintenance Bond.—Your committee on bituminous concrete recommends with reference to maintenance bond that where a municipality desires a maintenance bond it shall be made for the period of from 3 to 5 years, the longer period to apply to the heavier class of construction.

MACADAM PAVING

The committee on macadam was composed of the following: Walter G. Leininger, Chairman, Assistant Superintendent of Streets, Department of Public Works, Chicago, Ill.; Arthur S. Lewis, Secretary and Superintendent, Lincoln Park Commission, Chicago, Ill.; W. T. Brooke, City Engineer, Norfolk, Va.; Wright Smith, City Engineer, Mobile, Ala.; L. C. L. Smith, Consulting Engineer, Department of Public Works, Borough of Queens, New York City.

Because of the omission of the specification for water bound macadam and changes in the specifications for bituminous macadam, the report of the committee on macadam paving specifications and the specifications are reprinted in full, except those portions of the specifications which are the same as those for bituminous concrete:

Your committee on macadam specifications begs to submit for your discussion and approval the appended specifications for bituminous macadam pavement. Members of this committee unanimously agree that water bound macadam pavement is not a proper permanent pavement to lay for the following reasons:

First—Since the introduction of the automobile this pavement will not withstand automobile traffic.

Second—That bituminous macadam can be laid to withstand this traffic at a cost equal to water bound macadam when the maintenance is taken into consideration. That water bound macadam pavement on residential streets, unless properly sprinkled either with oil or water, is an objectionable pavement on account of the dust for the abutting property owners, and unless a great deal of care is taken in sprinkling water, the road is injured to a large extent, and if oil is used it can better be done by original construction, using a penetration method.

In order to avoid confusion we ask that this type of road be known as bituminous macadam pavement, and would suggest that pavements laid by the mixing method be referred to as bituminous concrete. We have held joint meetings with the committee on bituminous concrete and have made a similar construction for the foundations that they have made for their type of road. We have used the same sizes of stone in order to standardize stone sizes as nearly as possible. We have added to our specifications of last year chemical requirements for the bituminous binder, and we have attempted to make this agree as nearly as possible with the chemical requirements called for in the specifications recommended by the committee on bituminous concrete.

Specifications for Bituminous Macadam Pavement

The specifications in so far as they relate to subgrade, subdrainage and new macadam foundation, are the same as Specification "X" for bituminous concrete.

The following portions of the specification are new:

Top or Wearing Surface Course.—Upon the foundation shall be evenly spread stone which shall pass a 2½-in. revolving screen and be retained upon a 1-in. revolving screen to a finished depth of 2½ ins. This course shall be dry-rolled with a road roller weighing not less than 10 tons until the individual fragments have keyed together, the surface while even and conforming to the required crown, being left open or porous in order to allow the penetration of the hot bituminous binder.

Bituminous Cement.—The bituminous cement may be either asphaltic cement or refined coal tar.

Asphaltic Cement.—The asphaltic cement may be prepared in the following manner:

- (1) (a) From refined natural asphalt;
- (b) From the residue obtained in the careful distillation either with or without oxidation of asphaltic or semi-asphaltic petroleum;
- (c) From any uniform combination of the preceding materials, together with a suitable flux, if flux be necessary, such combination being subject to the approval of the engineer.

Each bidder must state the nature and origin of the bitumen to be used by him, and further, shall submit samples of the bitumen with his proposal.

The asphaltic cement shall pass the requirements designated below: Penetration shall be from 100 to 180 at 77° F. (The above penetrations are measured in 100 cms. with a No. 2 needle weighted with 100 grams acting for 5 secs.)

(2) When 20 grams of the cement are maintained at a temperature of 325° F. for 5 hours in a tin box 2½ ins. in diameter, there must not be a volatilization of more than 3 per cent. by weight of the bitumen present nor shall the original penetration be reduced thereby over one-half.

(3) The bitumen of the asphaltic cement shall yield upon ignition not more than 15 per cent. of fixed carbon.

The method of test employed is that recommended by the committee on coal analysis of the American Chemical Society.

(4) Of the bitumen of the asphaltic cement which is soluble in carbon disulphide 98½ per cent. shall be soluble in carbon tetrachloride. In this test for carbenes the asphaltic cement to be tested should be allowed to stand over night covered with purified carbon tetrachloride. The test to be performed in subdued light.

(5) At 32° F. the bitumen of the cement shall have a penetration of not less than 8 when tested one minute with the needle weighted to 200 grams.

(6) The cement shall not flash at a less temperature than 350° F., New York State Closed Oil Tester.

The specification for coal tar cement is the same as that for coal tar cement in Specification "X" for bituminous concrete. The remaining portions of the specification are new and are as follows:

The binder shall be heated in an approved heater equipped with a fixed or portable thermometer which will clearly and accurately indicate the temperature of the binder. The bituminous binder shall be heated at not less than 250° F. nor more than 324° F., and shall be uniformly distributed over the macadam by suitable appliances at a rate of not less than 1½ gals. per sq. yd. Directly after application, clean trap rock or equally satisfactory stone chips free from dust and consisting of fragments which will pass a 1-in. screen and be retained upon a ¾-in. screen, shall be spread over the surface in sufficient quantities to fill the surface voids and prevent the binder from sticking to the wheels of the roller. Care shall be exercised not to apply more stone chips than will just fill the interstices, and any surplus material shall then be swept from the surface as directed. The road shall then be rolled until solid, more stone chips or screenings being applied as required in order to maintain satisfactory conditions.

A seal, flush, paint or squeegee coat of the hot binder shall be uniformly distributed over the surface at a rate of at least ½ gal. per sq. yd. Clean stone chips or screenings such as previously described shall then be spread over this seal coat in just sufficient quantity to take up all excess of binder and form a smooth, well bonded surface when rolled. The road shall be rolled until smooth and firm and to the proper lines and grades.

The stone must be dry and free from dirt or dust at the time of applying the bituminous binders. The application of binder shall not be made when the atmospheric temperature is below 50° F., unless especially permitted by the engineer.

Maintenance.—The committee recommends that the maintenance or guarantee provisions be governed by local conditions. Where the engineer has proper control of drawing specifications, testing the material, inspecting the construction and maintaining the pavement, it is not deemed advisable to require a guarantee bond. In other cases, or in case of untried or experimental materials of construction, it is recommended that guarantee provisions be inserted following along the lines indicated in the report of the committee on bonds and guarantees.

Other suitable contract or general specification clauses may be added as deemed necessary.

Contemplated Road Improvements in Burma, British India

Consul M. K. Moorehead of Rangoon writes, in a recent number of the "Daily Consular and Trade Reports," that it is the intention of the government to spend approximately \$1,000,000 a year for a period of ten years in the improvement of the roads of Burma.

The existing roads are to be metaled; permanent steel and masonry bridges are to be built in place of the present

wooden structures; branch and feeder roads are to be built, and the present short stretches of road are to be connected up. From Moulmein to Victoria Point, in Tenasserim, a trunk road with branches will be constructed.

When this work has been done, it is stated, Burma will possess about 1,100 miles of main roads, extending northward from Rangoon to Shwebo and southward from Moulmein to Victoria Point, as well as 1,673 miles of metaled roads which have already been built. In addition to this mileage, there will also be about 2,000 miles of feeder roads. This will give the province a total of 2,800 miles of first-class roads and 8,000 miles of cart roads and bridle paths. The average cost of the construction of first-class metaled roads, with necessary bridges, is estimated at from \$6,000 to \$7,000 per mile. The proposed improvements must first be passed upon by the Burma Legislative Council and then approved by the Government of India and the Secretary of State. The work will probably be done by the Public Works Department.

The present road mileage of Burma, it is stated, comprises, in addition to the 1,673 miles of metaled road already mentioned, 5,497 miles of unmetaled road, consisting mostly of cart roads and bridle paths. In all Burma, according to the report, there are only a little over 100 miles of road suitable for motor traffic. The metaled roads are built chiefly of burnt clay, pebbles, laterite and local stone, all of which deteriorate rapidly even under moderately heavy traffic. None of the roads is over 10 ft. wide, and 90 per cent. of the bridges are wooden.

No new metaled roads have been built in the province during the past two years because of lack of funds, and, in addition to this, many of the existing roads have fallen into disrepair because of the meagerness of the appropriations for maintenance. No effort to build roads so as to meet the requirements of the province as a whole has been made in the construction of the highways, the result being that the existing roads are scattered over the country, each built for the apparent purpose of meeting local demands and without connection with other roads. It is stated that there are large sections of the country which have no outlet for their produce because of the lack of roads and that the utility of the railways is impaired by the lack of feeder highways.

The Government of Burma has been considering means of improving the roads for some time, but the lack of provincial funds has made any considerable expenditure impossible. In 1910 the Government of India was asked to appropriate from the Imperial funds 40 lakhs of rupees (\$1,297,320) annually for five years to provide funds for this purpose. This request having been refused, it is stated, it is now proposed to raise the required funds by a special tax on the exportation of rice, for ten years. There is already a duty on rice exported to foreign countries which amounts to 3 annas (6 cts.) per maund (82 2-7 lbs.), and the proposed tax will amount to 4 annas (8 cts.) per 224-lb. bag exported to India and 1 anna (2 cts.) on that exported to foreign countries. It is estimated that this tax would produce an annual revenue of \$1,031,208, of which \$735,887 would be derived from exports to India and the remainder from exports to foreign countries.

Winnipeg, Canada, is said to be one of the leading cities of the new world in the matter of municipal ownership. Among the municipally owned public utilities are an asphalt plant, a stone quarry and a plant for the laying of cement sidewalks. It is claimed that under municipal ownership it has been possible for the city to lay asphalt pavement at a cost varying from \$2.50 to \$2.85 per sq. yd., and it is reported that the city is about to adopt as standard an asphalt macadam type of pavement which will be laid for 90 cts. per sq. yd.

How City Planning Bills Are to be Paid*

By NELSON P. LEWIS

Chief Engineer, Board of Estimate and Apportionment, New York City

In discussing city planning there is frequently a disposition to ignore such practical questions as that which is the subject of this paper. The writer recalls one occasion at a public dinner when a gentleman of distinguished reputation in the world of art expressed his sense of humiliation that one of the speakers, who was the chief financial officer of the city, should have introduced such sordid considerations as those of cost when the discussion up to that time had been confined to things of beauty. He assured his hearers that when, a few centuries ago, the men of Sienna or Florence wanted to do something to adorn their cities, they did not stop to consider the cost but went ahead and did it and thought about the expense afterward.

In contrast with this a prominent officer of a real estate holding company recently expressed his strong disapproval of any widening of streets or readjustment of street lines which was calculated to facilitate traffic, whether vehicular or pedestrian. He admitted that such changes might be advantageous to the city at large and would stimulate the development of outlying sections, but as his company owned a large amount of business property in the older part of the city, he believed that the rental value of that particular property for retail shops would be greater if the movement of the people were so obstructed that they would be compelled to loiter, to look into the shop windows and go in and buy.

We may have less patience with the latter than with the former point of view, yet both are inimical to real progress in city planning. He who scorns any consideration of cost may by his enthusiasm succeed in committing the city to projects which will seriously cripple its finances for years to come and render the public suspicious of any improvement, while he who openly avows his supreme selfishness may possibly arouse a feeling of indignation which will result in bringing about the very things he would like to prevent.

The question of how the bills are to be paid is not only a pertinent but a necessary one and cannot be avoided. To provide for a city of 100,000, with no apparent reason for exceptional growth, an ambitious scheme suited to a metropolis of several millions is to invite disaster; while to limit the plan of a large and rapidly growing city occupying a strategic position to one suited to its present size will seriously retard its future orderly development and may prevent it from realizing the growth and importance of which its natural advantages appear to give promise.

The feeling is common and not unnatural that if we are planning more for the future than the present, future generations which will reap the benefit should bear the greater part of the burden. It seems easy to pay with borrowed money, particularly when the money can be borrowed for fifty years or the span of two generations. The habit of paying in this way is easily acquired and is broken with difficulty. When anything is paid for with money borrowed for a period longer than the possible or even probable life of the article purchased, the city's credit is improperly used. A corporation which pays for its betterments from earnings is on a sound basis. When large earnings are used to pay excessive dividends and betterments and renewals are paid from borrowed money representing additional obligations, there is danger. When interest on

existing debt is paid from funds raised by incurring more debt, disaster is imminent.

The only source of revenue of the American city is its power to tax. Its credit is due to this same power plus the value of its own property. The larger the city's debt which has been incurred for projects which are not self-sustaining, the greater will be the demands upon its taxing power to meet interest and sinking fund charges due to such debt, and the less will be its ability to undertake new improvements and at the same time meet the enormous running expense of the modern city. It might not be a forced comparison to say that the ordinary service which the city renders to the public through its administrative departments, the expenses of which are met by the regular tax levy, are the dividends which it pays to its stockholders, while for its betterments it must issue bonds or levy special assessments. Every bond issue requires an increase in the tax levy for a term of years in order to meet interest and amortization charges, curtailing by just so much the amount which can be expended upon municipal housekeeping expenses. In order to keep the tax rate within reasonable limits, expenses which should properly be met from the tax levy are often paid with borrowed money. Is not the city which adopts this policy actually doing the same thing as the business corporation which incurs additional debt in order to pay dividends?

The class of improvements which are commonly considered city planning projects are not self-sustaining. They consist for the most part in the correction of defects due to lack of proper planning. The property affected by them has presumably been already assessed for the acquisition and improvements of streets which were at the time considered adequate for its local needs. The widening and rearrangement of streets in built-up sections will, however, improve conditions and increase values, and a part of the expense should, therefore, be placed upon the property benefited.

In the more fundamental work of city planning, where unoccupied territory is being developed, the property will not have been assessed for improvements, and consequently the cost of the acquisition and construction of new streets can properly be assessed upon the adjoining property according to benefit, such benefit representing the entire cost in the case of local streets and a portion of the cost in the case of thoroughfares of metropolitan importance.

One principle should be invariably recognized, namely, where there is local benefit there should be local assessment. There can be no improvement which has been intelligently planned and executed without some local benefit, and it follows that there should always be some local assessment. No improvement, however small or however large, will be of equal benefit to the entire city and to distribute the burden of paying for it over the whole city according to taxable values is unfair in that it is not placed according to the benefit. The owners of property in the immediate vicinity are frequently enriched at the expense of those whose holdings are entirely outside the district directly affected.

Perhaps this statement should be so qualified as to exclude certain great improvements, such as public buildings, bridges, docks and rapid transit lines, and yet there is doubtless a local benefit resulting from these. It may be urged that such things are not included in what is com-

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monly called city planning. If so, the definition of city planning needs revision, for they are certainly most essential parts of any city plan.

The City Club of New York several years ago showed that as a result of the building of the first rapid transit subway in New York the actual land values in those portions of upper Manhattan and the Bronx which were most directly affected were within seven years increased \$80,500,000 above the normal increase for that period. The cost of that part of the subway passing through the districts where this rise in values took place was about \$13,000,000, while the cost of the entire subway from the Battery north was \$43,000,000. It is quite evident that if the \$13,000,000 which was spent upon that part of the subway traversing the district so notably benefited had been assessed directly upon the property, its owners would still have netted a neat profit of some \$67,00,000, while had the cost of the entire subway been assessed upon the same limited district, the net profit to the land owners would have been \$37,500,000. Was it quite fair that property in distant parts of the city, entirely unaffected by this great project, should bear the same proportion of the burden as that which was so conspicuously advantaged?

It is true that this improvement is entirely self-supporting, interest and amortization charges being provided from the rental paid by the operating company, but the local benefit was so clearly established that the rapid transit law was so amended as to permit the assessment of any part of the cost of future subways. Many new subways are now being planned, and some are being built, but it is doubtful if any of them will be self-supporting for years, the route furnishing the most intensive traffic having been followed by the line first built. The property owners along the present operating line having secured their benefit without direct tax, those along the proposed lines are not enthusiastic about being assessed for theirs, and there seems little prospect that the right to assess will be availed of.

To take another illustration from New York: Two new court houses are about to be built, one in New York County, the other in Kings County. In the former case a site has been selected to include a large area which will provide sites for still other public buildings and result in the creation of a real civic center. What will be the effect upon the neighboring property of the expenditure of the millions required for this site and buildings? There is abundant evidence to justify the prediction that its value will be doubled, if not trebled, by the time the first building has been completed. Is it fair or just that the owners of this contiguous property should be enriched through no action of their own and that they should bear the same proportion of the expense, according to their taxable values, as will those owning property ten miles distant?

It needs no extended argument to prove the equity and wisdom of local assessment wherever there is local benefit. That it has been done to such a limited extent in the past is no reason why it should not be more generally done in the future. That certain property owners have heretofore been treated with such prodigal liberality is no good reason why others should fatten through a continuation of an irrational and essentially unfair policy. To the degree that the assessment plan is adopted, to that same degree will the city place itself upon a cash rather than upon a credit basis.

It may be urged that the adoption of such a policy would discourage the agitation for and execution of many desirable city planning projects, that American cities have been slow to appreciate the advantages of intelligent city planning, and now that there has been a marked awakening it would be unwise to suggest the adoption of a policy which might dampen this new born enthusiasm. A desire for something which involves no direct cost is not a sign of intelligent interest. We are learning that the improvement of our cities pays. That is a hopeful sign. If we have

simply reached the stage where we want better conditions only if someone else is to pay the bills, the hope has not a very substantial basis. If we want them badly enough to pay for them ourselves in proportion to the benefit we feel sure will follow, we are making real progress.

Assuming that a case has been made in favor of assessing the cost of all improvements in accordance with prospective benefit, we are still confronted with a very difficult problem. The direct and indirect benefit must be estimated in advance. We cannot first carry out our city planning schemes and afterwards determine how the cost is to be met. Furthermore, we must determine to what extent the benefit will be strictly local, in what degree it will extend to a larger tributary area, and, again, how much it will mean to the entire city or metropolitan district.

In the case of residential streets, the purpose of which is to give light, air and access to the dwellings located upon them, the benefit will be entirely local, and the entire cost can properly be imposed upon the abutting property. When a highway is given a more generous width in the expectation that it will be called upon to accommodate a certain amount of through traffic, the benefit is more extended, and the assessment in such a case may be prolonged to a line midway between it and the next street of more than residential width. The major part of the cost should, however, be confined to the abutting property, so that the cost to it shall be somewhat more than that of the narrower street. In the case of arterial thoroughfares, or in that of the first street to be opened through an undeveloped territory, the effect of which will be to give access to and stimulate the development of a large area, the district of benefit will be correspondingly enlarged. Again, in the case of thoroughfares of exceptional width, which it is proposed to treat as boulevards, the entire city or metropolitan district will be substantially benefited and should bear a portion of the expense. In fact, the state itself may derive an advantage which would justify its assumption of a portion of the cost, but the disposition to recognize such an obligation on the part of the commonwealth is exceedingly rare, even though a great city within its limits may, through its large taxable values, contribute the larger part of the state's revenues by which its rural highways are maintained.

In the case of parks this same principle might be applied. Some small parks are of strictly local benefit, and their cost could properly be placed upon the district in which they are located. Every park, whether small or large, is of some local benefit, even if such benefit were deemed to consist solely in unobstructed light and air to the property on the surrounding streets.

In the case of street widenings or the cutting through of new streets, the local advantage is less marked, though it will always follow. The mere fact that a widening or extension is required to accommodate traffic is conclusive evidence that the street has assumed more than local importance. The width of the roadway as widened is not an index of its local or general importance. There may be cases where the opening up of a new street of a width commonly given to local streets and extending for a very short distance would, on account of its strategic position, be of very great general and of little local benefit.

It is quite apparent that the relative local, district or general benefit of any street or other improvement can be determined neither by its dimensions nor its cost. An improvement involving an expenditure of \$1,000,000 in one part of the city may be more distinctly local in its beneficial effect than one costing \$50,000 in another section. No fixed rule can be established to govern the distribution of the expense. It must be determined in each case after a painstaking investigation. Such investigation should not be entrusted to a different individual, board or commission in each case. There should be a permanent body which should act in all cases. This body should not be large, and

it should be so constituted that its entire personnel could not be changed at once, thus insuring continuity and consistency of policy. They should be broad men whose training should have fitted them for their difficult and delicate duties. The misleading evidence commonly called expert testimony as to existing and prospective values will be of little value to them. They should be capable by experience and intelligence of forming their own conclusions.

While no definite rule can be adopted to govern the distribution of assessments representing the district and general benefit, it should be possible to prescribe a method of determining the amount and extent of local benefit, particularly in the case of new streets, boulevards and parks. Let us assume that 60 ft. is the normal width required for a local street; then the entire cost of acquiring and improving all streets 60 ft. or less in width may properly be placed upon the property within a half block on either side of the street. In the case of wider streets that proportion of the cost represented by the ratio which 60 ft. plus 25 per cent. of the excess over 60 ft. bears to the width of the street would probably be an equitable proportion to assess upon the local district.

Inasmuch as property fronting a wide street is more valuable, it would be manifestly unfair to adopt a rule which would result in making the cost of a 70 or 80-ft. street less to the abutting owner than would have been the cost of a street 60 ft. wide. On the other hand, after a street reaches certain proportions, additional width will not involve additional benefit. It may be assumed that a share of the expense which would be equivalent to paying for a street 80 ft. wide should represent the limit of local assessment. This limit would be reached under the rule proposed when the street becomes 140 ft. wide. The percentage of cost which would be locally assessed would, therefore, be as follows for various street widths: 60 ft., 100 per cent.; 70 ft., 89.3 per cent.; 80 ft., 81.25 per cent.; 90 ft., 75 per cent.; 100 ft., 70 per cent.; 120 ft., 62.5 per cent.; 140 ft., 57.1 per cent.; 150 ft., 53.3 per cent.; 200 ft., 40 per cent.

In the case of parks the problem is more difficult, the amount of local assessment and the extent of the area of local benefit being determined by the size and shape of the park and facility of access to it from other parts of the city. In any case, no rule should be adopted until it has been carefully tested and it has been demonstrated that the assessments levied in accordance with it will constantly decrease with the distance from the improvement. This decrease should not be directly in proportion to the distance, but in a geometrical ratio.

A curve to determine the distribution of the assessments after the limits of the district have been decided has been proposed by Mr. Arthur S. Tuttle, Assistant Chief Engineer of the Board of Estimate and Apportionment of New York City, in accordance with which about 32.5 per cent. of the assessment would be placed upon the first 10 per cent. of the distance to the outer limit of the area of benefit, 55 per cent. upon the first 25 per cent. and 80 per cent. upon the district extending half way to the boundary of the assessment area.

In the case of street widening involving the destruction of buildings, it is suggested that the same general principles be adopted as in the case of new streets, but that they be applied to the land values only. If the street were less than 60 ft. wide, the proportion of the expense for additional land in order to make it 60 ft. would be assessed upon the half block on each side, while for all excess over 60 ft. the same rule already proposed could be adopted.

For instance, if a street 50 ft. wide were to be widened to 80 ft., involving the acquisition of 30 ft. of additional property, the first 10 ft. required to make it 60 ft. and 25

per cent. of the 20 ft. over 60 ft., a total of 15 ft., or one-half of the cost of the additional land to be taken, might be assessed locally, the expense involved in damage to buildings being included in the district assessment, or in the general assessment if the improvement were of sufficient importance to involve general benefit. If the same street were to be widened to 100 ft., the local assessment under the same rule would be for 20 of the 50 ft. to be acquired, or 40 per cent. of the total land damage, the damage to buildings, as before, being included in the district or general assessment.

Special cases would undoubtedly arise which would require special treatment, but it is probable that in the great majority of improvements the method proposed would result in an equitable distribution of the burden. Those who are to pay the bills have a right to know in advance how the costs are to be apportioned, and the formulation of a policy which can be consistently followed is not only desirable but necessary.

The problem of determining whether or not there is general benefit and the proportion of the cost representing such benefit will be difficult. A typical case is that of a new boulevard recently laid out in the city of New York and now being acquired. It has been given a width of 200 ft. and extends from one of the great bridges over the East River directly across the Borough of Queens to Jamaica, and it is expected that it will ultimately be carried to the ocean front. It will afford ready access not only to the highway system of the Borough of Queens, but to all of Long Island. It includes within its lines an existing highway about 80 ft. in width.

Owing to its strategic position, this boulevard will be of more than local benefit. It was thought proper in this case to assess upon an area extending 800 ft. on each side that proportion of the cost of acquiring title represented by increasing the existing highway from 80 to 100 ft. Of the remaining 100 ft. it was decided to impose three-eighths upon the Borough of Queens and five-eighths upon the city at large. This division would have placed upon the local area, the borough and the city 16.7 per cent., 31.2 per cent. and 52.1 per cent., respectively, but these were rounded off to 20 per cent., 30 per cent. and 50 per cent.

In the improvement of this highway it is proposed to construct one central driveway 44 ft. wide, with parking spaces 30 ft. wide on each side, and outside of these, side roadways 28 ft. and sidewalks 20 ft. in width, the side roadways and walks to be treated strictly as local improvements and assessed directly upon the abutting property, and the central driveway and parking spaces to be treated as a part of the park system and to be built at the expense of the entire city. It is believed that such a distribution of the expense is just, but there has been a disposition to consider it a precedent for similar treatment in the case of other streets where the general public benefit would be far less, while in some instances there would be none.

Demands for the apportionment of the expense of local streets as though they were thoroughfares of metropolitan importance must be consistently denied, however powerful may be the influences exerted to induce special treatment in certain cases. A policy which is manifestly just will ultimately win popular favor. To hastily adopt a plan for the distribution of costs which afterwards proves unworkable, and which must, therefore, be modified, will involve some injustice as between those who may have been assessed by one plan and those whose burdens may be determined by a revised plan. The policy should, therefore, be carefully studied and thoroughly tested before its adoption, after which it should be consistently adhered to. It follows that such a policy should be confined to principles, rather than be expressed in percentages, for special cases

will inevitably occur where a principle can be applied, while a rigid rule involving fixed percentages would entail serious hardship.

There is one other method by which the expense of city planning projects could be met, at least in part, namely, through recoupment by the exercise of the right of excess condemnation where this right exists, but this subject is to be treated in another paper, and is simply referred to in this connection.

Where the financial condition of the city will permit, the burdens of the property owner can be considerably lightened by the recognition of deferred benefit and a correspondingly deferred assessment. In this case the city would carry the amount until the benefit resulting from the improvement should have been fully realized, or, in other words, should have been reflected in actual increase in values. Similar relief could be given by permitting the payment of assessments in installments carrying a moderate rate of interest. Either plan would require larger capital to finance such improvements, and would to that extent impair the city's borrowing capacity for other purposes. These, however, are matters of detail and have to do with the manner of collection of the assessments, rather than the distribution of the expense.

The general principles which should, in the writer's opinion, govern the distribution of the cost of city improvements, may be briefly summarized as follows:

1. Where there is local benefit, there should always be local assessment.
2. The entire city or the metropolitan district should bear no part of the expense unless the improvement is in some degree of metropolitan importance and benefit.
3. Assessments should not be confined to the cost of acquiring and improving streets, but should extend to any improvement which will increase the value of the neighboring property, and should be apportioned as nearly as possible according to the probable benefit.
4. A workable policy once adopted should be consistently adhered to.
5. The determination of a policy and its application to each case should be entrusted to a board composed of men especially qualified, whose terms of office should so overlap as to insure continuity of policy and purpose.

Apportioning the Cost of Pavements in the City of Utica

The methods of apportioning the cost of pavement work in the city of Utica, N. Y., are explained in detail by Geo. C. Warren, President of the Warren Brothers Co., of Boston, Mass., in a recent article printed in the "Utica Daily Press." Mr. Warren, who was at one time a resident of Utica, wrote the article after attending the Fourth National Conference on City Planning at Boston in May, and in it he not only explains the system in vogue in Utica but also contrasts it with the methods followed in other cities, especially Boston, New York and St. Louis.

In Boston, according to Mr. Warren, the cost of the first improvement is assessed on the abutting property, and all subsequent repairs and renewals are paid for from the general budget. The results of this, he says, are, in the first place, that it is the almost universal practice of the property owners to accept the cheapest form of roadway and sidewalk that can be put down, since they know that the maintenance charges will be paid by the city and that when a better construction becomes necessary the entire cost will be borne by the municipality. In the second place, so many miles of street are paved in this way that it is impossible for the city to secure the money from its limited tax budget and limit of bonded indebtedness to lay the necessary amount of improved pavement and at the same time keep the old roads in condition.

Practically the same condition as to paying for improvements obtains in New York, Mr. Warren says, and with about the same results. In that city the cheaper pavements have been more generally replaced with those of more modern types, but this has been done by issuing bonds amounting to millions of dollars and running for long terms. These terms are much longer than the reasonable life of the pavements, and the result is that many miles of streets in New York have been repaved two and sometimes three times out of the proceeds of these long-time bond issues before the first of the successive bond issues has been paid for.

In St. Louis, according to Mr. Warren, the entire cost of all street pavements and renewals is assessed on the abutting property, the contractor being given tax bills against each individual piece of land. Although these bear interest at 7 per cent. and are liens taking precedence over mortgages and all similar liabilities except city taxes, they cannot be sold except at a heavy discount, since investors generally do not want to carry the paper because its collection requires so much formality and because it is issued in such odd amounts and is payable in annual installments.

These three cities, according to Mr. Warren, furnish extreme examples of what he considers very unwise systems of financing public improvements. In addition to the schemes outlined, he says, there are others of various kinds, in some of which it is necessary for the contractor to discount the municipal paper given him in payment for his work as much as 15 per cent. All of this, of course, results either in a greater cost for the work or else in poorer construction and, perhaps, in some cases, both.

The system followed in Utica is considered by Mr. Warren to be much superior to these others and to be a safe, sane and equitable arrangement. The essential points of this system as described by Mr. Warren are as follows:

"1. The city pays one-third the cost of all original pavements and all renewals thereof and provides for this out of the annual tax budget, the paving fund thus created being an annual tax of less than an average of \$1 per capita of population, which is not enough to hurt any.

"2. The remaining two-thirds of the cost of original pavements and all renewals is assessed on the abutting frontage, each individual assessed being given the option of paying the whole or any part of his or her assessment in cash or deferring payment for six annual installments with six per cent. interest. To cover the deferred assessments the city issues six paving bonds, each for one-sixth of the whole amount of such deferred assessments, and payable in one, two, three, four, five and six years with five per cent. interest, the due dates of the bonds and assessments being coincident. The city loses nothing on account of the credit it gives to the taxpayers and the premium the city gets for the bonds and the one per cent. extra interest charged the taxpayers fully pays all clerical or other expense of the city in the transaction.

"3. The city at large pays for minor repairs required between the time of laying the original pavement and the necessity of reconstruction or resurfacing."

According to the American Consul General at London, the United Kingdom imports annually about 65,000 tons of rock asphalt. The imports from various countries in 1910, with their values per long ton, were as follows: Germany, 24,960 tons, at \$11.33; France, 11,985 tons, at \$10.27; Italy, 10,308 tons, at \$9; British West Africa, 15,421 tons, at \$14; United States, 3,697 tons, at \$20. Asphalt paving work in London is said to be entirely in the hands of two firms, one French and one Italian. These, according to the report, are employed constantly in repaving and repairing streets and walks in the city. Outside of the city area, maintenance is in charge of the different municipal boroughs.

Paying the Bills for City Improvements*

By JAMES A. GALLIVAN

Street Commissioner, Boston, Mass.

A few days ago a Boston newspaper, briefly referring to the approaching visit to our city of the gentlemen who compose this association, advised the city's representatives at these gatherings not to concede too much to the delegates who are here from beyond our borders who may feel prompted to criticize Boston because it is not "laid out" on the checkerboard pattern. The writer of the paragraph was apparently anxious that we should let you folks know that we are conscious of the structural shortcomings which were imposed upon us by earlier centuries, and which many a city has been able to avoid by reason of the fact that it was built the other day. And while we were advised to acknowledge cheerfully that our streets are narrow, that our waterfront is not all that it should be, that we still accommodate a few slum districts, and cannot hope to hide certain waste areas that should have been developed years ago, we were not to forget to let you know that we are now widening some of our streets, that we are building up the waste areas and have already started the great work for the improvement of the port of Boston.

Boston is indeed honored in the presence of this conference in its city, and fortunate in the opportunity afforded of acquiring at first hand a knowledge of the proper and scientific solution of those varied problems that have grown to be such serious defects in the civic and social life of our American municipalities. The modern city planning movement, conceived largely in this country in the desire to cure the evil of congestion of population, has now become an all-embracing study. The great broad field of human endeavor, all the complex forces of social and industrial life, private and public interests, individual and collective cooperation, all bear important relation to the science of city planning, but underlying all, as a practical matter of compelling interest, is the question of the city streets, those great arteries through which flows its life blood and the basis of its prosperity and proper healthy growth.

I regret to state that Boston with respect to the science of city planning offers little of an instructive nature unless it be to teach the lesson of the futility of not looking beyond one's generation in the planning of the streets of the city, and the dangers of inadequate laws constituting almost insuperable obstacles in the way of systematic improvement.

There is a growing tendency of late years to recognize the charm of the irregular and informal plans evolved out of the necessities of the times. Old Boston with its crooked and twisting ways is rich in historic association; it appeals to the patriot, the romanticist and the aesthete; some of the old streets are hallowed spots where stirring scenes of our country's history were enacted, and are still fragrant with the memory of our revolutionary heroes; but there is also the practical aspect which must be considered if the city's industrial needs are to be served, if the commercial life is to be given free and convenient means of circulation and the population afforded adequate facilities for transportation and communication. Unfortunately here in Boston we are forced to recognize deplorable street conditions in the business section of the city which, uncorrected, are bound to hamper its growth, and, worse still, we are forced supinely to contemplate the evil because ill-advised legislation prevents the remedying of the defects on a proper financial basis. The streets of business Boston today are choked with foot and vehicular traffic—not a

sudden culmination by any means, nor the result of unforeseen development—but rather because the population and trade of the city have increased in a natural way with no effort made from year to year for devising a well formulated scheme of relief. Like many of our large American cities, we have progressed beyond that stage where a comprehensive plan, starting with an imposing civic center and embracing radial and circumferential highways could be realized, but eventually American ingenuity will bring cosmos out of the chaos of the immature and impulsive planning of past years, so that what Voltaire said of his own Paris, "We see every day what is wanting in our city and content ourselves with murmuring," may not forever be said of us.

At the third national conference in Philadelphia it was decided that, in the scheme of city planning or replanning, the cost of local improvements should be paid for by special assessments upon the benefited districts. In our theory of law this form of tax represents an enhancement of private values. Boston's special assessment law was enacted in 1891 and was designed to return to the city practically the entire cost of such work, but ten years after its passage, during which time millions had been expended for improvements, litigation and the importunate demands of realty owners for a change in the law led to the enactment of legislation which compelled the city to assume at least one-half of the cost of every street improvement it enacted, and to limit its assessable districts to within 125 ft. of the street opened or improved; it is under such unwise restrictions that this city today is laboring. Forty millions of Boston's outstanding funded debt has been issued for street and sewer improvements from which tremendous private profits have resulted.

I believe it is fundamentally wrong for a state legislature to compel a city to assume a fixed proportion of the cost of its street improvements. This should be determined by the municipal body or officers charged with the duty of making the assessment. The Federal Supreme Court has laid down the rule that these charges must be limited by the measure of the benefit conferred, but this principle was enunciated, I submit, no more to afford protection to the owner of land against the imposition of oppressive charges than to indicate to what extent cities might justly demand reimbursement for those expenditures of public funds which result in private gain. If the right of the city to assess for local improvements is to be qualified in the authorizing statute the classes of street improvements should be differentiated for assessment purposes according to functional needs. The entire cost of constructing a forty-foot residential street should be borne entirely by abutting landowners. In some cities the entire expense of street openings and widenings up to sixty feet in width is assessed on contiguous land. The streets exceeding forty feet in width are usually built in response to general public demands, not alone to furnish ordinary street facilities to abutting land, and as the width increases so the direct benefit to abutting land becomes a proportionately smaller part of the whole cost and the benefited district expands. It is only fair to expect the city to assume a part of the cost of the more pretentious improvements, such as boulevards, main highways and traffic thoroughfares, but the point I wish to emphasize is, that the practical determination of special assessments should be delegated to the municipality, whose officials are of necessity familiar with the nature and scope of the work for which the charges are levied as well as the character and

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value of properties within the assessable districts. These restrictions are usually imposed by legislative bodies at the behest of real estate interests, and the lack of wisdom shown by such laws is well evidenced by that provision in our Massachusetts statute which compels a limitation of assessable districts to a distance of 125 ft. from the improvement in entire disregard of the actual distance and area of the benefit conferred. The inadequacy of a law delimiting assessable districts is well shown by the assessment levied on account of the Bennington Street boulevard constructed in this city a few years ago at a cost of \$700,000. An assessment was made of \$56,000, about 8 per cent., and the Legislature, at the request of persons assessed, has recently passed an act recommending the abatement of even this meager sum. The fact that the legislative enactment, according to our Federal Supreme Court, as far as assessable districts are concerned, is not open to review by the court, does not justify such a law.

The truth of the matter, in regard to this method of financing local improvements, is that the ordinary taxpayer looks with particular resentment upon special assessments of any kind. General taxation is regarded and anticipated as an incident to the ownership of real estate, a pure civic responsibility, but it is an extremely different matter to convince owners that the construction of local improvements enhances the value of their holdings, and the frankest professions and assurances of willingness to pay assessments made at the time these improvements are sought, very frequently are transformed, after completion of the work, into feelings of antagonism which often culminate in long drawn out litigation. In many instances, I will admit, this antagonism is justified. The restriction of assessments to a radius of 125 ft. necessitates the limitation of the amount assessed to 50 per cent. of the cost, because it seldom happens (and then only in 40-ft. residential street openings) that the benefit of the improvement within the limited radius exceeds or even equals this percentage. This is particularly true in those parts of Boston where the benefit, as measured by the rise of valuations in the immediate vicinity, proves disappointing. So that, after all, there is a perverse consistency in the yoking together of these two limitations, each of which in itself is unjust to the city as a whole.

The logical result of the inability of the city to get back even a reasonable percentage of its outlay from the property owners has been a reduction of activity in this direction. In other cities, as, for example, in New York, where the property owners over a wide area pay the larger part of the cost, the authorities may go ahead boldly and satisfy the demands of traffic by laying out new thoroughfares at will; but in Boston every such venture means a considerable addition to the debt of the city.

At the same time, our needs are perhaps greater than those of the newer cities, because of our complicated highway plan, narrow streets and congested business district. The pressure of absolute necessity has led to the examination of new methods of assessment for street construction, culminating in the partial adoption, by means of a constitutional amendment, of what is known as the excess condemnation method. This system has been favored elsewhere because it enables the city to take over the remnants or odds and ends of estates which in some of our thoroughfares, as well as in those of New York, have led to a motley and irregular frontage, offensive to lovers of symmetry in construction and actually detrimental to the growth of business in the streets affected. Its advocates, moreover, argued from the experience of foreign cities that it would enable Boston to pay the whole cost of its street improvements and even reap a profit, where now the only question is the extent of the loss. This seemed to a good many of us at the time a rather roseate view to take, for if the full benefit to the estates within a radius

of 125 ft. is seldom equal to one-half the cost, it would seem difficult for the city to recover the whole cost by taking over the title to the same property, holding it for a term of years, and then reselling it.

However, at our state election last year the people adopted this constitutional amendment. Briefly stated, it permits the Legislature to pass acts for street improvements wherein more land than is required for the street may be taken, the same to be sold after the completion of the improvement. This amendment had been agitated for many years by people who honestly believed it would cause a revolution in the methods of making highway improvements. The advocates of this measure also believed that it would help to solve the question of a city beautiful, because, as I have explained, the city could control the use of the excess land taken by placing upon it restrictions as to the character of buildings to be erected, their height, use, and anything else which would satisfy the aesthetic tastes of the community. In this respect they are undoubtedly right, but, if our study of the problem amounts to anything, they will fall far short of their expectations on the financial side.

Before entering more fully into a discussion of the possibilities of excess takings, it may not be amiss to say a brief word of an ambitious attempt to apply the principle of excess condemnation in the cities and towns of this commonwealth. In the statutes of 1904 may be found a comprehensive act which had some of the purposes in view for which you gentlemen of the City Planning Conference are striving. This act is known as chapter 443 of that year. It was adopted after a careful study of the problem, including personal studies abroad by members of a commission which had been appointed for the purpose, and which actually drew the bill. This act intended to provide that cities and towns, or even the commonwealth itself, might acquire all of a piece of property, any part of which was to be taken for a highway improvement, and sell the excess of land after the completion of the improvement. A study of the act would be worth the while of any person interested, if for no other purpose than to observe the extreme care exercised in making it, and the safeguards thrown about the property involved.

Though this act has been on the statute books for eight years, I know of no instance of its being invoked. The constitutionality of the act was questioned from the beginning, which probably accounts for its not being used. The existence of the act shows, however, that here in Boston the subject of correct city planning had long been given serious attention.

Undoubtedly there are opportunities to invoke the excess condemnation provision of our laws in the improvement of highways without great cost to the city. The business centers of large and growing cities undergo changes every few years, due largely to expansion of trade. If this expansion could be gauged with some degree of accuracy, a few years in advance, the street improvements necessary to bring about the best results could probably be made so as to give the city the fullest returns on the expenditure required.

Soon after the adoption of the constitutional amendment, about which I am speaking, the board, of which I am a member, made an exhaustive study of this method of city highway development, with results which I think will interest you. I will take but two examples of the study, and I select them because they are widely different in the manner in which they work out.

Nothing is more needed in this city than a broad highway connecting the two terminal stations. Such a highway is particularly needed for teaming traffic and for the transportation of passengers. A plan for such a highway has been prepared. It proposes not only the widening of existing thoroughfares, but also the making of an entirely new

way through property which has a high market value. The proposition is for a way 100 ft. wide. It would be without doubt of tremendous value to a very large section of the city. The assessed value of the property which would be taken for the way itself is \$8,118,811. If only remnants of estates which would be affected by the improvement were taken \$3,804,889 would have to be added.

It is thought that, if the fullest use of the excess condemnation principle is to be applied, takings for a distance of 125 ft. from the line of the improvement ought to be made. To make such a taking would involve property having an assessed value of \$7,875,700, making a total assessed value of all the property involved \$19,799,000.

This is a pretty large sum for a city whose borrowing capacity is less than one-quarter of this sum. Bear in mind that this is only the assessed value. When property is taken for public purposes it is rarely obtained for the assessed value. Perhaps in a case such as I am discussing, where the property has a large and sure rental value, the city might be required to pay as high as 50 per cent. over the assessed value for such as would be taken. This would add \$9,899,500 additional to the foregoing figures, making the total about \$28,698,500 for land and buildings.

To get this vast sum back into the city treasury it has been estimated that the excess land would have to sell at 153 per cent. over its present assessed value. Can you conceive of such a tremendous enhancement of values merely because the city has laid out a broad highway which would be devoted largely to transportation purposes? For myself, I confess I cannot see such a great increase in values immediately following such an improvement. If such an improvement should be made, under the conditions I have described, ought the city to hold the excess property taken until such time as it would be sold at the advance named? What would the city do with the property while awaiting a favorable market? Ought the city to put it in order for occupancy and rent it during the time it has it on its hands? It seems to me that our constitutional amendment does not contemplate anything of the kind. I doubt that the city could even put new fronts into buildings that had been partially destroyed, and if it cannot do this, imagine what an unsightly condition a street would be in, with the interiors of buildings exposed with hideous effect.

Unless the city should improve such buildings and rent them while awaiting a favorable market, the disadvantages of such a method of street improvement would be far greater than any possible benefits. There would, in addition, be the loss of taxes, no inconsiderable item, and the interest on the money borrowed for the undertaking.

As showing that there is some merit in the principle of excess condemnation, I have in mind a street in this city which it is proposed to improve, and which, judging by the estimates, it seems can be made under excess condemnation proceedings to the great advantage of the city. This street is in line of the development of the Park Square lands, so-called, the abandoned site of a railroad station. It is proposed to widen this street, taking property which, it is estimated, will be damaged to the extent of about \$900,000. It so happens that a large portion of the property to be taken is either owned or controlled by the New Haven Railroad, whose representatives show a disposition to treat with the city on an extremely liberal basis.

The total cost of this improvement, including excess takings, is estimated at \$950,000. It is further estimated that the net cost to the city would be but \$100,000, because it is believed a ready market at a good price would be found for the excess land which would be sold by the city.

A betterment assessment is involved in the foregoing, which is an important factor in bringing the net cost of this improvement down to the low sum of \$100,000. For

this improvement it is proposed to allow the city authorities to assess wherever they may find a benefit, and to assess the full benefit, which in my judgment is the right way.

Now, in addition, this would be an improvement which would aid in bringing into the market a large tract of land which has lain dormant for many years, and, perhaps, the creation of a new retail center, carrying its benefits far beyond the street itself, thus adding greatly to the taxable value of the city and in a short time wiping out every expenditure which the city has made.

If a broad highway, such as is proposed between the north and south terminals, is to be laid out, I believe it can be done without great cost to the city and without invoking the aid of the excess condemnation law, by extending the assessable area and by assessing the benefit rather than 50 per cent. of the cost. I would create a zone for assessing purposes. This zone could be made wide enough to recover back practically all that the improvement would cost. If a tunnel is to be constructed under the street for the railroad, as has been proposed, I would have the railroad pay a fair portion of the cost of the construction of the highway.

The zone system of assessments could be justly applied to an improvement of this character, because it would be an improvement which would be of benefit to almost the entire business district of the city by giving the wholesale and retail houses better and more rapid facilities for carrying on their business.

On the whole, however, I do not see any great benefit in excess condemnation methods except in isolated cases. The advocates of this method, from what I have been able to glean, have had the impression that it was a great success abroad. The principle has been well tried in London, and it is not a success there, viewed from the standpoint of cost. As showing its failure in this respect, I will quote a paragraph from the report of the London Traffic Branch of the Board of Trade, made in 1908, as follows:

"It is difficult to make any direct comparison of the relative advantages of widening old and making new streets. Both operations are necessarily costly. It is often supposed to be more economical to make a new street if enough land is taken, but the expectation that the disposal of valuable sites fronting an improvement repays, or nearly repays, the original outlay is seldom borne out by experience. The most striking example of success attending an operation of this kind is Northumberland Avenue, where the amount realized by the disposal of surplus land exceeded the cost of the improvement by £119,000 (\$595,000). This amount was, however, arrived at without taking the charges for interest on the outlay into account, and these charges could not have been small, since some six years elapsed after the completion of the improvement before any of the surplus land was let. The satisfactory result in this case was due mainly to the fact that the operation did not involve the acquisition of valuable trade interests, and that land in such a central situation was much in request. The street, moreover, is short. A new street of considerable length is apt to fill up slowly, and as years may elapse before all the building sites are disposed of, a large addition to the net cost may have to be made by way of interest."

From the studies of the board, of which I am a member, I am convinced that here in Boston we would get similar results.

Answering, then, the query, who shall pay the cost of city planning, I believe there is no good reason, moral, legal or economic, why the millions expended by our American municipalities for streets, sewers, parks, sidewalks, waterfront improvements and subways should not be returned to them in generous proportion by landowners who reap such tremendous resultant profits.

Methods of Making Road Surveys Adopted by the Illinois Highway Commission

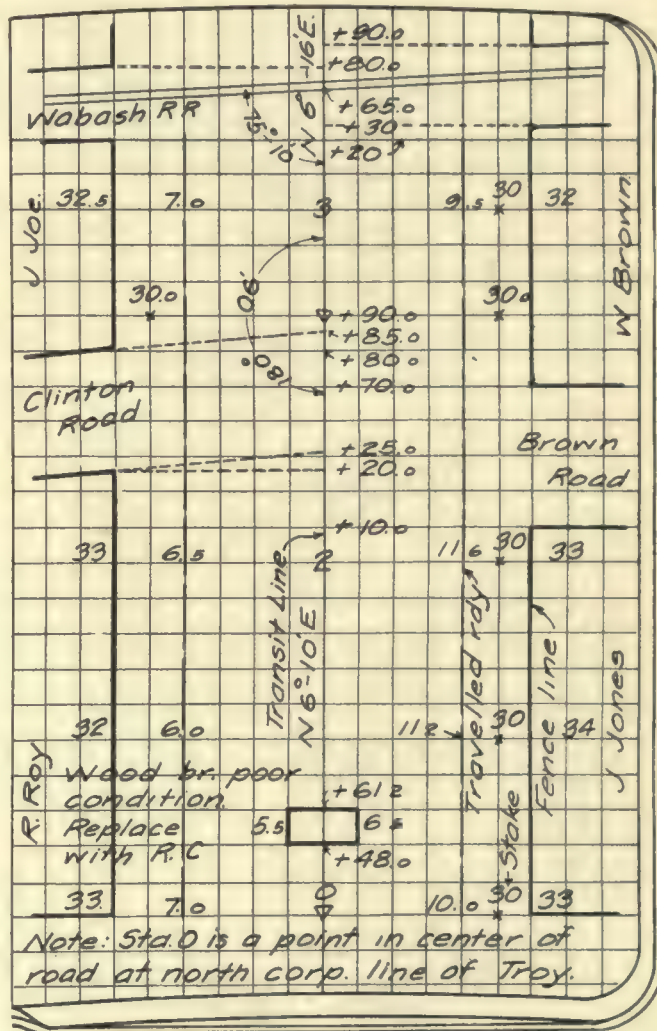
There has lately been issued by the Illinois Highway Commission a manual of instructions to engineers. It is known as Bulletin No. 8 of the commission, and is a book of 80 pages containing instructions to engineers in charge of road work, instructions to roller operators and instructions to engineers in charge of bridge work.

In the section devoted to rules and regulations for the guidance of engineers in charge of road work, several pages are given to the subject of road surveys. In the following paragraphs some of the principal points relating to this subject are given.

ing of cross sections. These points are preserved by driving a heavy spike through a piece of cloth into the ground.

At each station established on the line stakes are driven in at the side of the road, far enough from the traveled portion to be clear of all construction work or travel. These stakes are 24 ins. by 2 ins. by 1 in., and are driven into the ground to a depth of 15 or 18 ins. The stations are numbered in the usual way, that is, each 100 ft. is a unit and intermediate stations are given the number of the previous station with + 25, + 50, etc., the numbers being marked on the stakes at the side of the road. On these

Sta.	+	H. I.	-	Elev.
B.M.#1	Spike driven in root of elm tree east of Sta 0 + 20			
				Assumed elevation 100.00
B.M.#1	5.62			100.00
		105.62		
Center profile back of 0				
	-1	-2	-3	-4
	10.0	10.8	11.6	12.2
	95.6	94.8	94.0	93.4
0	60	50	30	10 5 0 5 -3
	9.6	11.6	10.0	11.0 10.5 9.0 8.2 9.0
Bridge Top floor				10.5 95.12
Bed of stream				14.6 91.02
1	62	56	41	25 9 0 5 -2
	8.6	9.1	9.8	9.2 9.9 9.7 9.3 9.6
2	60	55	40	25 9 0 5 -3
	8.2	9.5	9.9	8.8 10.1 9.7 9.1 9.8
+40	R 100'	7.5		+50 L 100' 8.2
3	55	35	25	12 0 5 -2
	6.6	7.6	6.0	7.2 6.6 6.2 6.7
+65	40	30	W 10'	* Top of 5 Rail E 10 20 30
	6.5	7.2	5.9 5.8	5.6 7.1 6.6
TP	4.85		4.33	101.29
		106.14		



LEFT AND RIGHT HAND PAGES OF ROAD SURVEY NOTE BOOK.—NOTES KEPT IN ACCORDANCE WITH RULES OF
THE ILLINOIS HIGHWAY COMMISSION.

Engineers assigned to the making of surveys obtain from the office of the department the necessary supplies, including note books and a camera, which are charged up against them. On the completion of the survey the supplies are returned and a release card secured. The instructions provide that all notes and data on the survey must be included in the note book and that the note book must be fully indexed before being turned in at the office.

In making surveys, transit lines are established following approximately the center line of the road between fences, temporary stations being put in at each 100 ft. and at such intermediate points as may be required for the tak-

stakes are also recorded the distances from the center of the stake to the station point on the transit line, measured to the nearest 0.1 ft., the measurement being made after the stake is driven, and recorded in the notes. Station 0 is referenced to some permanent monument or to established lines and to the center line of the road surveyed.

Transit points are made wherever it is necessary to change the direction of the line. At these transit points the angle measured is always that from the backsight around to the right to the foresight, the readings being made to the nearest minute and magnetic bearings taken on the backsight and foresight where local disturbances

do not prevent. Transit points are made at even stations or half stations where possible. At all transit points stakes are set on both sides of the road at right angles with the back course. These stakes are driven in flush with the ground, and stakes for markers driven near by. Tacks are driven into the tops of the reference stakes, and the distance to the transit point measured to the nearest 0.01 ft. and recorded in the notes.

After the establishment of the transit line, the various features which it is desired to show on the map are located by off-set measurements, taken at each station and at such intermediate points as may be necessary. The sides of the traveled path, fences, walls, ditches and all other features affecting the proposed improvement, are located in this way. Measurements are also taken locating all bridges, culverts and cross drains, with their abutments or retaining walls. In the notes, the clear span and clear depth of all bridge structures are shown, and the direction of the stream flow indicated by arrows. In addition to this, concise descriptions of the structures are given, with detailed notes as to their present condition and such recommendations for reconstruction, if the structure is to be rebuilt, as may be necessary. The notes also show the location of all cross roads, cross walks, driveways and buildings near the road. The names of abutting landowners or tenants are indicated and division fences located. In addition to this information, such other notes as may affect the proposed work are included.

After the survey has been made, the levels are run with an engineer's level, permanent bench marks being established at each end of the work and at convenient intermediate points. Four or five bench marks are put in on each mile of road, each mark being on some permanent object on which a rod can be easily held, which can be readily identified at some future time, and which is far enough away from the road to insure permanency. After the taking of the levels, a check line is run touching every bench mark, separate notes being kept of this run.

Readings for ground elevations are taken to the nearest 0.1 ft. Ground elevations at the center of the road are taken at each station and at such other points as may be necessary to show changes in grade on the profile. As many side readings as may be necessary to show accurately the cross section of the road are taken at each station where center readings are taken. Six or eight of these at each station are usually sufficient, although more may be taken if required to show the true shape of the cross section. The distance of the rod from the center line is recorded with the rod reading in each case.

Besides the ground elevations, elevations are taken at the following points:

1. The bottom of the opening at each end of each culvert, the ends being designated as east, west, north or south.
2. Bridge floors and the tops of abutments or bridge seats.
3. The bottoms of ditches at the entrances and exits and at about 100 ft. from either end of all culverts and all bridges.
4. High and low water in streams, as nearly as can be estimated.
5. The water surface of all streams.
6. At points 100 ft. in both directions at intersecting roads, and at points 100 ft. from the transit line at all important entrances.
7. All rails of intersecting railroad or trolley tracks.
8. Cross walks and the ends of brick pavements contiguous to the work.

The center profile is run 300 ft. beyond the end of the survey at each end. At least six photographs to the mile are taken over the entire length of the road, one being taken at either end and others at intervals of about 1,000

ft. If necessary, in order to show special features, photographs should be taken at shorter intervals than 1,000 ft.

The accompanying illustration shows the left and right hand pages of a road survey note book in which the notes are made in accordance with the instructions of the Illinois Highway Commission. The left hand page shows the level notes and the right hand page the transit notes.

Increased Use of Motor Vehicles in London, England

One of the chief factors in the problem confronting highway engineers and one which is, perhaps, given too little attention by them in some cases is the traffic which highways are called upon to carry. The importance of this is well exemplified by the changes necessitated in methods of road and street construction and maintenance through the development of the motor driven vehicle abroad.

In "A Commercial Review of the United Kingdom," by Consul-General John L. Griffiths of London, appearing in a recent number of the "Daily Consular and Trade Reports," it was estimated at the close of the year 1911 that approximately 14 per cent. of the business traffic through London streets was carried by means of motor vehicles. It is stated that the leading manufacturers have placed large orders for commercial vehicles and that the demand exceeds the supply. The success of the motor-driven omnibus in London has been so great that during the past seven years about 5,000 horse-drawn omnibuses and 18,000 horses have been replaced by some 2,500 motor omnibuses. It is estimated, according to Mr. Griffiths, that double the number of these omnibuses now in service could be employed profitably on the routes in London and its suburbs. It is believed, he states, that one great development of this motor omnibus service will be in affording to working men and women an opportunity of going a considerable distance into the country on Sundays at a comparatively small expense. An additional inducement for the extension of this service is found in the fact that few railway trains are run in England on Sunday.

Larger Appropriation for Massachusetts Road Work

Governor Foss has recently signed an appropriation bill passed by the Massachusetts Legislature providing for an annual expenditure twice that formerly made in Massachusetts.

The appropriation is for \$5,000,000, to be used in 1913 and the four following years, at the rate of \$1,000,000 a year. So far as the terms of the bill are concerned, they are the same as those under which the former annual appropriations of \$500,000 were made, except as regards the total amounts available. As before, 5 per cent. of the amount will be available yearly in towns having a valuation of less than \$1,000,000, the town making no contribution; 5 per cent. in towns having a valuation of less than \$1,000,000, provided they contribute an equal amount, and 5 per cent. in towns having a valuation of over \$1,000,000, provided they contribute an equal amount. Under the old appropriation, there was available \$25,000 in towns of each of these three classes, and \$425,000 was left for state highway work. The present appropriation doubles the amount in each case.

Reports from Buenos Aires, Argentina, are to the effect that a plan has been prepared for the construction of an avenue, 3 miles long and 165 feet wide, along the La Plata River. The roadway will be built on land reclaimed from the river and will involve the erection of a wall 13 ft. thick. The plans include the construction of a double track railway in the center of the roadway, with a 36-ft. pavement on either side.

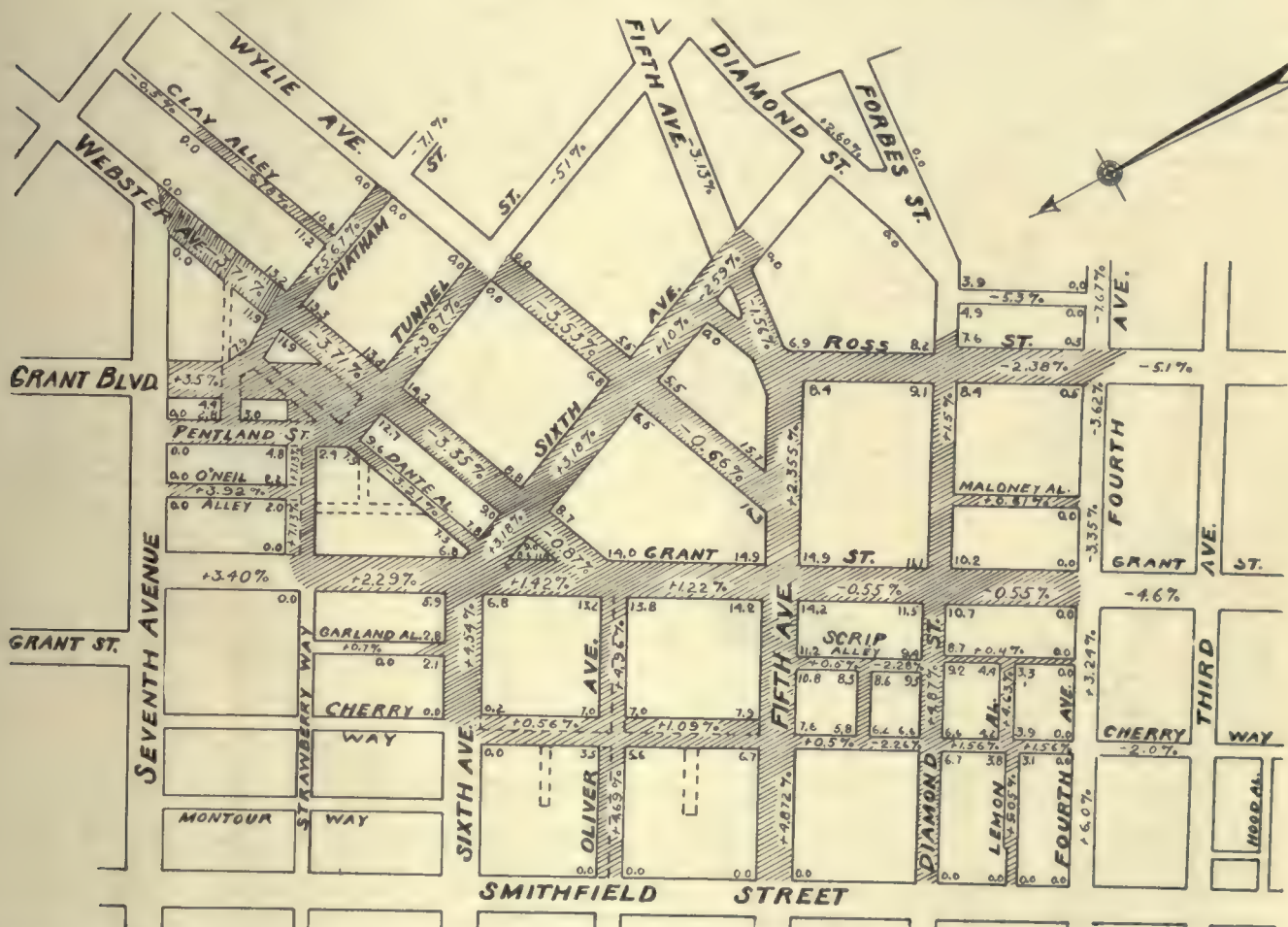
The Pittsburgh "Hump" Cut

As noted briefly in the issue of April 6, the work of regrading in Pittsburgh consisting of the removal of what is known as the "hump" was begun on April 5 of this year. This improvement has been agitated for many years, and is a project somewhat similar to the regrading work done by the city of Seattle which was described in "Good Roads" for December, 1909.

The so-called "hump" district of Pittsburgh is situated in the "Point" section of the city, about three-quarters of a mile from the junction of the Allegheny and Monongahela rivers and a few blocks north of the latter river. At Smithfield St. the flat ground of the "Point" rises at a considerable grade to Grant St., two blocks east. One block be-

1911 the proposition received the approval of the city officials, and the work as undertaken is in accordance with plans differing but little from those embodied in Mr. Olmsted's report.

The area affected by the regrading work comprises about 0.1 sq. mi., and involves the regrading of about 1,200 lin. ft. of streets, the maximum cut being 16.3 ft. Bids were asked on the work, and the contract awarded on April 5 to Booth & Flinn, Ltd., of Pittsburgh, for \$671,450. Some of the principal items on which bids were submitted and the successful bidder's prices on these items were as follows: Excavation, 143,000 cu. yds., \$3.00; stone block pavement, 13,700 sq. yds., \$3.75; creosoted wood block pavement,



SKETCH OF HUMP CUT DISTRICT, PITTSBURGH, PENN.—SHOWING STREETS TO BE CUT, DEPTHS OF CUTS AND NEW STREET GRADIENTS

yond Grant St., at Ross St., the ground again drops some 10 or 15 ft., leaving a slight "hump," with its summit between Grant and Ross streets. At the top of this elevation are situated the Frick Building, the County Court House and the County Jail.

It is believed that this condition is responsible for the fact that the business district practically extends no farther east than Grant St., and for many years the matter of cutting down the "hump" has been agitated. One of the most active agents in urging this work has been the Pittsburgh Civic Commission, which is an unofficial organization for the promotion of civic betterments in the city. In 1910, Frederick Law Olmsted submitted to the commission a report on various improvements in Pittsburgh, and in it strongly recommended the "hump" cut, making specific recommendations and presenting plans for the work. During

10,700 sq. yds., \$4.00; repressed vitrified brick pavement, 4,600 sq. yds., \$3.00; protected concrete curb, 20,200 lin. ft., \$1.00; granite crossings, 4,800 sq. ft., 75 cts.; concrete sidewalk, 175,000 sq. ft., 20 cts. The work is to be completed by January 1, 1914.

The excavated material is to be taken across the Allegheny River to the Northside, where it will be used for filling in the "flood district." Certain streets in this territory are to be raised, in some instances to a height of 10 ft., in order to place them out of danger from the spring and fall freshets. Some two million square feet are covered by this contract, which is also held by Booth & Flinn, Ltd.

The accompanying sketch shows the streets involved in the cut, the shaded portions representing the sections to be cut. The cuts are shown by the small figures outside of the street lines, and the gradients marked are the new ones.

Proposed New Boulevard on Long Island

The Topographical Bureau of the Borough of Queens, New York City, under the supervision of Clifford B. Moore, Engineer in Charge, has prepared a tentative map of the Hollis-Queens-Springfield section of the proposed Grand Central Parkway, which will extend easterly along the brow of the ridge of hills overlooking Jamaica Bay, the Atlantic Ocean, and at some points, Long Island Sound, to the Nassau County line at Success Lake. At this point the parkway will connect with the Long Island Motor Parkway, which leads easterly through Long Island to Lake Ronkonkoma. It will also connect with Marcus Ave., the new state road that leads southeasterly to Mineola, Hempstead and Garden City.

This proposed parkway will really be an extension of the Eastern Parkway in Brooklyn, and of the Queens Boulevard, which leads from the Queensborough bridge. Queens Boulevard, the construction of which has already been authorized, and which is now being mapped for street opening proceedings by the Topographical Bureau, begins at the new diagonal street near the easterly end of the bridge plaza, and will extend easterly at a width of 200 ft. to the

leads through Forest Park and join Union Turnpike at Forest Hills near the new office of the Queens Borough Park Department.

Ashland Ave., which is now being legally opened, connects with Jamaica Ave., near the Brooklyn Borough line and extends easterly along the southern boundary of Forest Park and connects with the 100 ft. park drive, which is now being laid out through Kew Gardens in Richmond Hill. This drive borders the easterly extremity of the park until it connects with Union Turnpike near the junction of Queens Boulevard.

When these links in the chain are completed there will be a parkway extending all the way across the Boroughs of Brooklyn and Queens from the Prospect Park Plaza in Brooklyn to the westerly end of Nassau County joining the Motor Parkway.

This will permit automobilists of Brooklyn and Manhattan to drive over a wide boulevard through Queens out to the border line of Nassau County, thence from the new Motor Parkway for 50 miles across the entire width of Nassau County and into Suffolk County. While all of the



SKETCH SHOWING PROPOSED BOULEVARD SYSTEM IN THE BOROUGH OF QUEENS, NEW YORK CITY.

Union Turnpike. From the Union Turnpike southerly to Hillside Ave. its width will be reduced to 150 ft. At this point it will join the Grand Central Parkway.

The Eastern Parkway in Brooklyn, which begins at the plaza of Prospect Park now extends easterly through Highland Park to the Cypress Hills reservoir. A small branch extends southerly and connects with Jamaica Ave. on the south.

On account of the fact that the Cypress Hills Cemetery was incorporated under the rural cemetery act, it was necessary to secure a special act of the Legislature permitting the condemnation of this property for the extension of Eastern Parkway through the cemetery. This has been accomplished and the proposed extension is in the hands of a committee of the Board of Estimate and Apportionment, consisting of Borough President Connolly, of the Borough of Queens, Controller Prendergast, President Steers, of the Borough of Brooklyn, and President Mitchell of the Board of Aldermen.

This proposed extension of Eastern Parkway is shown on the tentative map. After passing through the cemetery the extension will join Forest Park near the Forest Park Golf Club house and will connect with the parkway that now

proposed parkway has not yet been authorized, its construction has been made practically certain by the cooperation of the property holders along that section of the line which has not yet received official sanction.

The stretch between Queens Boulevard and Success Lake will probably be built by property owners, as nearly all the residents along the line have signified their willingness to contribute. This parkway will be a part of a system of boulevards which will eventually cover Long Island in every direction from Brooklyn and Queens to Montauk Point.

The Topographical Bureau is at present making surveys and drawing preliminary maps for other important boulevards and parkways in various parts of the western section of the island.

An example of the strength sometimes developed by bitumen bound broken stone roads was furnished recently in the city of Houston, Tex., where storm water washing into an excavation at a street corner undermined a section of bitulithic pavement, 30 sq. ft. in area. The pavement was laid about three years ago, and is said to have carried the traffic passing over it without support of any kind.

Experimental Pavements on Second Ave., N. Y. City

Contracts have recently been awarded for the construction of all but two of the nine sections of experimental pavement to be laid on Second Avenue, New York City. This work, which is to be undertaken by the Manhattan Bureau of Highways, was noted briefly in this journal for June 15.

When laid the different sections will form a continuous pavement extending along Second Ave. from Houston St. northerly to 21st St. The roadway will be widened from 3rd St. to 21st St. from 57 to 60 ft. A 1:3:6 Portland cement concrete foundation will be laid over the entire length and on all sections the different pavements will be carried up to the outside of the street car tracks. The area in and between the tracks, except between 15th and 19th Sts., will be paved with improved granite blocks. Between 15th and 17th Sts., the railroad area will be paved with asphalt blocks, and between 17th and 19th Sts. with wood blocks, the pavement in each of these cases being the same within and without the railroad area.

The general character of the sections is as follows:

Section 1 extends from Houston St. to 3rd St., and will be paved with the usual type of asphalt blocks, laid according to the standard specifications of the borough. The contract for the work was awarded to the Harlem Contracting Co., New York City, for \$19,284.60.

Section 2 extends from 3rd St. to 5th St., and will be paved with Medina sandstone blocks, the blocks in the portion between 3d and 4th Sts. being 3½-in. cubes, and those in the portion between 4th and 5th Sts. being blocks from 3½ ins. to 5 ins. wide, and from 6 ins. to 6½ ins. deep. The pavement will be laid according to the specifications of the Borough of Brooklyn, Portland cement mortar being used in the joints in both cases. No bids were received on this section, and the contract will be readvertised.

Section 3 extends from 5th St. to 7th St., and will consist of a vitrified shale block pavement with Portland cement joints, laid in conformity with the specifications of the American Society of Municipal Improvements. No bids were received for this section, and the contract will be readvertised.

Section 4 consists of two sub-sections, which are not adjacent. The first extends from 7th St. to 9th St., and the second from 11th St. to 13th St. The section from 7th St. to 9th St. will be paved with a sheet asphalt pavement with open binder, laid under the standard specifications of the Borough of Manhattan. The second section will be paved with a sheet asphalt pavement with a close binder and a surface mixture designed especially for heavy traffic. It will be laid in accordance with the standard specifications of the borough. The contract was awarded to the Sicilian Asphalt Paving Co., New York City, for \$18,308.

Section 5 extends from 9th St. to 11th St., and will be paved with asphalt blocks made from imported rock asphalt. The contract was awarded to the Sicilian Asphalt Paving Co., New York City, for \$9,965.60.

Section 6 extends from 13th St. to 15th St., and will be paved with wood blocks of long leaf yellow pine. The section will be divided into six sub-sections, on each of which blocks differently treated will be used, the treatments consisting of injections of light oil, heavy oil or water gas tar, at the rates of 16 and 20 lbs. per cu. ft. The contract was awarded to the United States Wood Preserving Co., New York City, for \$12,197.60.

Section 7 extends from 15th St. to 17th St., and will consist of an asphalt block pavement. The blocks are to be of a slightly different composition from those provided for

in the standard specifications, and are to have a water absorption test of 0.6 instead of 1.0, as provided for in the standard specifications, the object of the variation being to produce a block better able to withstand heavy traffic. The contract was awarded to the Harlem Contracting Co., New York City, for \$14,093.90.

Section 8 extends from 17th St. to 19th St., and will consist of a wood block pavement in which two different woods and several different treatments will be included. An Australian wood will be used on part of the work and short leaf pine on the remainder. The Australian wood will not be treated, but will be dipped in hot tar before laying and painted with tar afterward. Three different treatments will be used for the short leaf pine, the preservatives employed being heavy oil, light oil and water gas tar, each used at the rate of 16 lbs. per cu. ft. The contract was awarded to the United States Wood Preserving Co., New York City, for \$13,947.

Section 9 extends from 19th St. to 21st St., and will be paved with a sheet asphalt pavement made from rock asphalt. The contract was awarded to the Sicilian Asphalt Paving Co., New York City, for \$12,993.

The traffic on Second Avenue is very heavy and is comparatively uniform over the length chosen for the experimental pavements. A traffic census has been taken, and others are to be taken at intervals. Other data necessary for a complete report on the behavior of the sections is to be secured by the officials of the Bureau of Highways, and careful records will be kept of any repairs made. All of the pavements, except the Medina stone and granite block, will be laid under a 5-year guarantee.

A Day's Road Work in Codington County, South Dakota

Twenty-four miles of road in Codington County were improved in one day, June 25, by the citizens of Watertown and other towns of the county.

The section built was Codington County's portion of the Meridian Highway from Galveston, Tex., to Winnipeg, Manitoba, and it is estimated that 1,000 men, with 300 horses and 25 steam and gasoline tractors took part in the work, which was under the supervision of State Engineer S. H. Lea.

A mass meeting, which was held in the morning, was addressed by the state engineer, and the workers were instructed in the details of road construction according to the general Meridian road plan.

Mayor Wagner and his staff of city officials, Adjutant General C. H. Englesby and a force of national guardsmen. Codington County officers and deputies and many merchants and professional men took part in the work. The women of Watertown organized, and furnished luncheon and carried food to the workers in automobiles.

The first convention of the Farmington and Rosemount Good Roads Association was held in Farmington, Minn., June 25. Thomas Feely, president of the Commercial Club, gave an address of welcome in the absence of Mayor C. A. Chapel. The principal address was made by Charles A. Forbes of the State Highway Commission. Among the other speakers were Magnus A. Brown, Rev. Father Power, Rev. J. A. Johnston and Rev. Riedell, all of Farmington. W. J. Gregg presided.

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MEMBERSHIP OF THE UNITED STATES IN THE INTERNATIONAL ASSOCIATION OF ROAD CONGRESSES

Membership in the Permanent International Association of Road Congresses ought to be held by the United States government. At the two international road congresses already held, the first at Paris in 1908 and the second in Brussels in 1910, the United States government and the governments of a number of the separate states have been represented, but neither the federal government nor any of the states has become a member of the Permanent International Association of Road Congresses. This has been a matter of much regret and some embarrassment to American members and delegates, as the United States has been practically the only one of the world powers failing to hold such membership.

All this has been noted in previous issues of "Good Roads," and though there are, perhaps, no new arguments to be put forth in urging the taking of the necessary action by the government, it may, perhaps, be worth while to again call attention to the situation and to emphasize the unenviable position in which the United States has been placed by its failure to avail itself of the opportunities presented.

The membership of the Permanent International Association of Road Congresses is made up of delegates of governments and corporations which make an annual subscription to the association, private members, and honorary members. The term "corporation" includes public departments; provincial governments; county, district, communal and municipal bodies; chambers of commerce; scientific or technical institutions; tourist or sporting clubs; provincial associations or trade unions; agricultural, industrial, commercial and transportation societies and companies, and similar bodies. The official standing of a country is determined by the amount of its annual subsidy, that is, by the amount paid in membership fees annually by individuals or corporations from that country. Each government is entitled to appoint one official delegate with the right to vote at any congress for each 250 francs of its annual subsidy, and each government has the right to representation in the Permanent International Association for each 1,000 francs of its total annual subsidy, except that no one country may have more than fifteen representatives.

At the dinner given by the American Road Builders' Association to W. Rees Jeffreys, an account of which has been given in previous issues, President Lewis of the American Road Builders' Association called attention to the failure of the United States government to secure membership in the permanent organization. The total contributions of American representatives at the last congress, according to Mr. Lewis, was in the form of the dues for individual or association memberships and amounted to only 530 francs. This was less, he said, than the sums contributed by Algeria, Argentina, Chili, China, Cuba, Japan, Mexico, Roumania or Siam. There were other countries which contributed even less than the United States, namely, Bulgaria, Colombia, Greece, Luxemburg, Tunis, Uruguay, Brazil, Egypt, Serbia, Sweden and Turkey. The governments of all of these, except the last five, made official contributions, thus giving their delegates a somewhat better standing than the delegates from the United States.

Comparing these countries with the United States in population, wealth, industrial progress and commercial development, the situation cannot fail to touch the pride of an American. Of the nine countries mentioned as having given more than the United States, none, with the exception of China, has a population approaching that of the United States. Of the eight, Japan and Algeria are the largest, the six remaining having a combined population considerably less than one-half of the population of this country. The total population of the eleven countries mentioned as having made smaller contributions than the United States is some ten or fifteen millions less than that of this country. Although population does not afford the best basis of comparison in a matter of this kind, the figures given furnish some indication of the conditions that have existed heretofore. Taking into consideration, also, the character of the twenty countries referred to and their state of civilization and progress, the existing conditions are still less flattering to this country.

It is to be hoped that the efforts which have lately been made to bring about action by Congress providing for membership by the United States government in the Permanent International Association will bear fruit and that when the next congress convenes in London an American delegate may feel that his country has done at least as well as Turkey, Bulgaria and Siam.

INVESTIGATION OF ROAD CONDITIONS BY ILLINOIS BANKERS

Some weeks ago when the report of the Mayor's Committee on New York City pavements was made public, this journal took occasion to criticise adversely attempts on the part of laymen to assume the functions of engineers in the study of road building problems. As was pointed out at that time, the report embraced investigations of strictly technical problems and set forth conclusions drawn from those investigations by a body of men who could not be considered competent to pass upon the questions involved. In the issue of June 15 there was printed a resume of a report which, in some respects, is similar to that of the Mayor's Committee, but which, in other respects, is entirely different. This is the report of the Illinois Bankers Association on road conditions in that state.

The Illinois report is like the New York City report in that it is the result of an investigation made by men who are in no sense road builders. There, however, its similarity ceases, for while the New York report dealt principally with the strictly engineering phases of the problem, the Illinois report is confined almost entirely to the economic and administrative questions, a study of which does not necessarily involve engineering skill. As was brought out in our article on that report, the bankers in any community constitute the class of laymen most closely in touch with questions involving finance. By training and experience they are thoroughly qualified to consider such questions and to draw inferences and conclusions from their study. That being the case, it seems safe to assume that this investigation was conducted along proper lines and that the findings of the bankers' committee are entitled to the careful consideration of those who are interested in the road problem, especially as regards administration and organization.

Taken as a whole, the question of highway betterment is one which requires the cooperation of all classes in a community. Certain parts of the work must be carried out by certain classes, and without the cooperation of all concerned the best results can never be obtained. The legislator, the road official, the engineer, the contractor and the taxpayer all have certain duties in connection with the work, and while these may overlap to some extent there are certain fixed limits within which each must perform his part without assistance or hindrance from any of the others. The planning, the supervision of the construction and the direction of the work of maintenance must be by the engineer, and usually, though not necessarily, the most efficient administration will also be by him. There are, however, certain phases of the work which can be better undertaken by others, and the present instance furnishes an excellent example of this.

The making of the investigation and report is also a proof of an increasing interest in highway improvement on the part of bankers and business men in general. If this work is to go on, its importance must be realized by those who pay the bills and who can make its prosecution possible. And it is perfectly right that those who pay should investigate, personally and through qualified experts employed to take up those phases of the question which require technical knowledge.

So long as committees and commissions made up of lawyers, bankers, business men and other laymen do not undertake the solution of the strictly engineering problems involved, their efforts are commendable and should be productive of good. The expenditure of the taxpayers' money for road improvement, like other similar public expenditures, should be regarded as a business, and those whose time and energy are devoted to business undertakings should be able to bring about improved conditions by turning their attention to it.

DISTRIBUTING THE COST OF CITY PAVEMENTS

What is probably one of the most complex and intricate problems involved in the administration of street department affairs in American municipalities is that of the equitable apportionment of the cost of paving and making other street improvements. It is also a problem to which too little study is given in many cases and for the solution of which faulty systems are too frequently devised.

Two excellent discussions of the question appear on other pages of this issue. One is by Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of New York City, and the other is by James A. Gallivan, a member of the Board of Street Commissioners of Boston, Mass. Both are men well qualified by their official experiences to deal with the subject of paying the bills for municipal improvements, and a careful perusal of the two papers will be of benefit to those who are interested in the matter.

The fundamental principle governing the distribution of the cost of street improvements—the assessment of a portion of the cost on abutters who are directly benefited, a portion on property owners in the districts less directly benefited, and the remainder on the city at large—is generally recognized. It is not always applied, however, nor is an attempt to apply it always attended by success.

The principle, though simple in its general terms, is far from simple in its application, because of the difficulty of determining the exact proportion of the whole cost which it is justifiable to assess against each particular beneficiary in the case of any specific work of improvement. This difficulty of analysis exists in all cities, and, generally speaking, increases as the size of the city, in respect to both area and population, increases. Further complications are produced by unusual local conditions, such as those affecting the transportation problem in New York City induced by the peculiar topographical features of Manhattan Island.

It is a self evident fact—or it should be—that every individual benefited by any public improvement should be obliged to bear a part of the expense of making that improvement. It is also apparent that the portion of the expense he should bear and the whole expense ought justly to be in the same ratio as his benefit and the total benefit. But the problem of determining the whole benefit and the individual benefit in each case depends upon so many factors that it is susceptible of only approximate solution, and hence the only course open to the official or officials confronted with the question is to study each improvement and levy assessments in such a way as to distribute the burden of cost as equitably as possible.

This and other phases of the problem are considered in the papers to which reference has been made. In both New York and Boston, peculiar conditions exist which make the problem unusually complex, and the experiences of the representatives of those two cities cannot fail to be of value in the study of the question in other municipalities.

A public hearing on the application of the city of Los Angeles, Ca., for an order determining the manner in which the proposed Harbor Boulevard, San Pedro and Front Sts., shall cross the tracks of the Southern Pacific Railroad and the Pacific Electric Co., will be held by the State Railroad Commission, July 8.

It is estimated that \$150,000 will be collected in excise licenses in Jackson County, Mo., in July. Of this sum \$100,000 will be spent on road building in the county. The County Surveyor has prepared plans for more than 20 proposed rock highways.

Quarterly Meeting of the Massachusetts Highway Association

The quarterly meeting of the Massachusetts Highway Association was held on Thursday, June 27, at Nahant, Mass., and was attended by about 120 members of the association and guests.

The meeting included a visit to a road between Lynn and Bass Point which is being built by the town of Nahant, and an inspection of the contractor's plant being used there, which includes considerable up-to-date road building equipment.

The road is 2 miles in length and will consist of a bituminous concrete road 30 ft. wide, which it is estimated will cost \$41,000. The cost will be paid by the town. The present macadam surface is to be scarified and then new stone added to bring the total thickness of macadam up to a depth of 4 ins. after rolling. On this will be laid a bituminous surfacing, 2 ins. in depth after rolling. This surfacing will be laid in one course and will consist of trap rock ranging in size from $\frac{1}{4}$ in. to $1\frac{1}{4}$ ins., heated to 180° F. and mixed with Bermudez Road Asphalt. The asphalt will be heated to not less than 350° F. and mixed with the stone at the rate of 16 gals. per cu. yd. The resulting mixture will be spread upon the road before it has cooled to a temperature below 100° F., raked and rolled with a tandem roller weighing not less than 7 tons. On this surface there will be applied a seal coat of Bermudez Road Asphalt at the rate of 1-3 gal. per sq. yd. This will be spread with squeegees or brooms, covered with clean trap rock pea stone and rolled until the stone bonds with the seal coat.

In order to provide for traffic over the road, one-half of the roadway will be constructed at a time. The bottom course of the side first laid is to be extended 2 ft. beyond the center of the road in order to provide the satisfactory bond with the remaining portion of the road. The bituminous wearing surface and the seal coat of the portion first laid will lap over the joint in the first course in the center, and when the other side is laid the first will be cut back to a uniform longitudinal line to obtain a satisfactory joint.

After inspecting the road, a business meeting and dinner were held at the Relay House, Bass Point, at 1 p. m. In addition, a demonstration of the automobile pressure distributor of the Barrett Mfg. Co. was held on Wharf St.

The secretary of the association, J. M. McCarthy, reports that 27 applications for membership were received, and that these will bring the total number of members up to 266.

Dinner to W. Rees Jeffreys at Toronto

W. Rees Jeffreys, Secretary of the British Road Board, who is touring the United States and Canada in the interest of the Third International Road Congress, to be held in London in 1913, was a guest of honor at a dinner of the Ontario Motor League, held June 26 at the National Club, Toronto, Ontario.

Mr. Jeffreys was introduced by W. A. McLean, Provincial Engineer of Highways of Ontario, who proposed the toast "Our Guest." In his reply, Mr. Jeffreys outlined the program of the coming congress and spoke on "The Highways of England." He expressed himself as opposed to the practice of spending large sums of money in building foundations for roads and leaving the maintenance to municipalities, which, he stated, lose sight of the necessity of keeping the entire road in repair, attending only to local sections. He said that in England the roads are resurfaced periodically by a central body and that in some places it is possible for people to travel several days along dustless highways.

F. E. Mutton, President of the Ontario Motor League, who occupied the chair, pledged the support of the organization in securing delegates for the congress.

The toast of the evening was "Good Roads," proposed by Dr. Doolittle, a member of the organization, who gave practical illustrations of what it is possible to accomplish in highway improvement with a small amount of money judiciously expended. He called attention to the difference in conditions in Canada and England on account of the extreme weather in the Dominion, and said that different methods must be used for the construction of Canadian roads.

Dean Galbraith of the faculty of applied science of the University of Toronto, spoke of the custom of the university to impress upon the students the importance of good highways.

Among those present were A. M. Rankin, M. P. P., F. E. Mutton, President of the Ontario Motor League, Dean Galbraith, R. P. Fairbairn, Deputy Minister of Public Works for Ontario, A. S. Forster, Reeve of Oakville, Jos. Race, City Engineer's Department, and Professor A. T. Laing of the University of Toronto.

Year Book of the American Association for Highway Improvement

The first year book of the American Association for Highway Improvement, that for 1912, the publication of which was announced by the association some time ago, has recently been issued. The book is 9 by 12 ins. in size, contains 446 pages and several illustrations, and is printed on heavy book paper and bound in cloth.

The first few pages of the book are given to a brief history of road building, with special paragraphs on the great road builders of history and the principal inventions of road building machinery. This is followed by a list of the officers of the American Association for Highway Improvement, its constitution, a sketch of its objects and of its accomplishments during the past year, and a list of its members.

The next portion of the book is devoted to the road laws of the various states of the Union. This occupies nearly 200 pages, and consists of digests of those laws in each state which relate to the administration of the highways. Immediately following this matter is a draft of a suggested state aid bill prepared by the U. S. Office of Public Roads, together with an analysis and explanation of the bill.

Thirty-six pages are given to chapters on types of roads, road maintenance and repair, dust preventives and highway bridges and culverts. The discussion of various types of roads, including earth, sand-clay, gravel, macadam, bituminous macadam, brick, concrete, asphalt blocks on country roads and patented methods of construction, takes up 23 of these 36 pages, and highway bridges and culverts 6 of them.

This is followed by a chapter on bond issues, appropriations and mileages in the various states, which occupies 39 pages. Included in this chapter there are data on bond issues and appropriations obtained from the different state highway officials and from other sources, and a considerable amount of statistics on road mileages, much of it taken from Bulletin No. 41 of the U. S. Office of Public Roads—"Mileage and Cost of Public Roads in the United States in 1909."

There is also a chapter, occupying 18 pages, on convict labor in the various states where that method of road making is pursued.

Other features in the book include a list of the principal highway officials in the various states; a list of patents pertaining to roads issued by the U. S. Patent Office during 1911; a list of trade names of various materials and forms

of construction; a list of general treatises on road and bridge construction and maintenance; a list of bulletins, circulars and documents relating to roads published by the U. S. Office of Public Roads and by various state departments and institutions; a list of road associations; a list containing the names of some of the principal road material and machinery manufacturers in this country, and a list of about 1,800 road contractors.

New Booklet on Bituminized Roads

A 56-page booklet bearing the title "The Construction and Maintenance of Roads with Bitumen by the Layer Method," has recently been issued by the manufacturers of the Johnston oil and tar sprayer.

The booklet consists of a concise treatise on the construction of bituminized roads in which bitumens are employed in successive applications, the term bitumens being used to designate tars or asphalts which require heating to about 200° F. before being sprayed upon the road. The contents include an introductory chapter dealing with the general subject of the use of bitumens in road construction; a chapter on foundations; a chapter discussing the advantages and disadvantages of tars and asphalts; a chapter on sand or gravel bituminous roads; one on the surface treatment of macadam roads; one on the bituminous blanket treatment of water bound macadam; one on the construction of bituminous macadam by the layer method, and another on the application of bituminous surface to concrete bases. In addition, there are several pages of general notes, and specifications for gravel, asphaltic oil and refined tar.

The Johnston sprayer, to which considerable attention is given in the booklet, is a pressure distributor by means of which the materials can be applied at any desired pressure up to 200 lbs. per sq. in. In use it is attached to a tank wagon drawn by a steam road roller, which also supplies steam for the pump on the distributor. A full description of the Johnston machine was printed in this journal for May of last year. ["Oil and Tar Distributors," *Good Roads*, May, 1911; p. 189.]

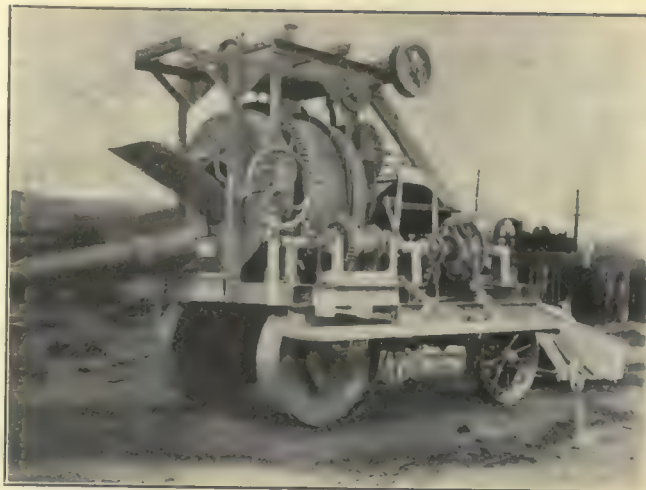
The booklet is 3½ by 6 ins. in size, well printed and illustrated. It is published by the Standard Manufacturing Co., 186 Union St., Worcester, Mass.

New Street Mixer

There is shown in the accompanying illustration a new mixer that has recently been put on the market for the use of contractors handling street work. It is equipped with a gasoline engine, a traction drive, charging skip and distributing chute, and has been designed especially for use in street paving work.

The machine consists, essentially, of a mixer with charging skip and delivery chute, mounted with an engine and the necessary gearing on a truck equipped to move under the machine's own power. The length of the machine, exclusive of the skip and chute, is 17 ft. 1 in.; with the skip lowered, the length is 20 ft. 10 ins.; the height, over all, with the skip raised, is 14 ft., and exclusive of the skip, 11 ft. 2 ins.; the extreme width is 8 ft. 6½ ins. The weight is 15,000 lbs.

The driving wheels are 44 ins. in diameter and the front wheels 40 ins., the tires being, respectively, 10 ins. and 6 ins. wide. The large wheels make possible the securing of an 18-in. clearance above the ground, which is sufficient to obviate the necessity for jacking up the machine in order to clear projecting manholes or similar obstructions in the street. Power is supplied by a 10 HP. two-cylinder opposed gasoline engine, the gears being so arranged that the drum can be thrown out and remain idle while the machine is traveling along the road, and a trac-



NEW STREET MIXER BUILT BY THE RANSOME CONCRETE MACHINERY CO.

tion device is also provided by means of which the machine can move in either direction under its own power. When desired, flanges may be bolted on the tires so that the machine can be run on trolley tracks instead of on the street surface, and if it is desired to draw the machine behind a trolley car at high speed, special flanged wheels may be substituted for those regularly furnished. Further modification may be made, if desired, by substituting an electric motor for the gasoline engine, the machine in this case taking power from an overhead trolley wire.

The outfit is equipped with a 20-ft. distributing chute. All the operating levers are arranged so as to be in reach from the operating platform at the side of the machine, at the front of which the steering wheel is placed. The mixer will handle loose material up to 20 cu. ft., and its rated capacity is from 40 to 60 batches per hour.

The machine is manufactured by the Ransome Concrete Machinery Co., of Dunellen, N. J., and is designated as No. 61. A machine of a somewhat similar type, designated as No. 60, has also recently been put on the market. This is a steam driven outfit with a 10-ft. distributing chute and capable of handling 14 cu. ft. of loose material and mixing from 40 to 60 batches per hour. The engine is 8 HP. and the boiler 9 HP., and the machine is arranged to drive in either direction along the work.

Recent reports of two automobile accidents and two motorcycle accidents occurring on the same road, and due to excessive oil on the surface of the road, direct attention to one of the undesirable results of a too free use of oil for dust laying. Though no fatalities resulted from these particular accidents, four of the eleven persons involved received more or less painful injuries and escaped more serious hurts merely through good fortune.

The Public Service Commission of Buffalo, N. Y., will hold a hearing July 12 relative to the manner in which Skillen St. shall be extended to cross the New York Central Railroad tracks. The preliminary meeting was held June 21 before Commissioner John B. Olmstead. It is said that opinions are divided as to whether a subway or viaduct would be more suitable.

At a meeting of prominent farmers held at National Hall, near Yoakum, Tex., a good roads club was organized with the following officers: President, Rud Hanys, Vice-President, J. J. Kuck, Secretary-Treasurer, Otto Boenigk.

Coming Meetings

July 8-12.—National Municipal League.—Annual Meeting, Los Angeles, Cal.—Clinton Rogers Woodruff, Secretary, 705 North American Building, Philadelphia, Pa.

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. J. E. Pennybacker, Secretary, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

General News

The \$750,000 road improvement bond issue recently issued by the City of Austin, Tex., has been sold to the Texas Trust Co.

The McCracken County Good Roads Association has been organized in Paducah, Ky., the object being to agitate the question of improving the highways of the county.

At a special election held in Altoona, Pa., recently, it was voted to increase the bonded debt of the city by the sum of \$150,000, which will be used for street improvement, sewage disposal plant, etc.

An election will be held in the near future in Dallas County, Ala., for the purpose of deciding whether or not bonds to the amount of \$100,000 shall be issued. The proceeds will be spent in improving roads.

At a recent meeting held in Sacramento, Cal., a tree planting committee was appointed to plant trees along the 42-mile drive, which will be made by the joining of the Folsom and Auburn roads with a macadam highway through Greenback Lane.

An organization, to be known as the Macon Good Roads Association, has been formed in Macon, Ga. The following are the officers: Harry M. Rubey, Pres.; T. Reichel, Vice Pres.; Fred H. Tedford, Sec'y., and Lee Miller, Treas.

Press reports state that arrangements are being made for a mass meeting of citizens of Fairmont District, W. Va., to be held in the Marion County Court House, in the interests of good roads. The question of good roads has been agitated in Marion County for some time, and, according to the reports, is likely to result in a large bond issue.

Contracts for the construction of state highways have been awarded in Sacramento, Cal. The contracts call for the construction of 37 miles of roads at a total cost of \$295,000, which is considerably below the estimate.

According to press reports the citizens of West Virginia will hold a "Good Roads Week." The purpose of this "Good Roads Week," which will commence on Monday, November 13, is to crystallize public sentiment in favor of the highway improvement.

The Chicago Portland Cement Co., 30 North La Salle St., Chicago, Ill., has issued a panel card calling attention to an article entitled "The Chicago Portland Cement Co. Today," which appears on pages 70, 71, 72 of the company's booklet "From the Raw to the Finished Product."

A block of asphalt macadam paving will be laid for experimental purposes on Nevada Ave., Colorado Springs, Colo., between Pikes Peak Ave. and Huerfano Ave. The pavement will be laid by the city and the Stratton Estate and will be put down to test the practicability of using that type in the outlying districts.

At a meeting, recently held in Tulsa, Okla., the Mid-Continent Good Roads Association was organized. The organization was formed to promote the construction of a highway across the state of Oklahoma. The following officers were elected: President, Earl Brown, Sapulpa; Secretary, C. S. Avery, Tulsa; Treasurer, T. C. Millner.

A delegation composed of citizens from Anoka County, Minn., and headed by J. T. Elwell of Minneapolis, appeared before the State Highway Commission recently to request that a preliminary survey be made on the road 27 miles long, running north from Minneapolis to Anoka County, the cost of the improvement to be borne equally by the state, county and property owners. The request was granted by the commission.

It is reported that a legislative measure has recently been enacted in New Mexico which provides that any promoter who stages a prize fight shall pay into the county treasury a license fee to be turned over to the state road fund. If the fight is less than 20 rounds the promoters must pay 5 per cent. of the gross receipts with a minimum of \$25. If the fight is more than 20 rounds the promoters are required to pay a fee of \$1,000.

An order has been passed by the Commissioners Court of St. Clair County, Ala., setting aside August 14, 15 and 16 as road working days. On these three days all the citizens of the county will be requested to give a part of the day to improving the roads.

Good roads were discussed at a recent meeting of the Chicago Association of Commerce held in the main dining room of the Hotel La Salle. Homer J. Tice, chairman of the State Highway Commission, spoke on good roads and their importance to the farm and landowner; William G. Edens, President of the Illinois Highway Improvement Association also spoke, his address being on the subject "Cooperation, The Key to a Successful Good Roads Movement."

The National Old Trails Ocean-to-Ocean Highway Association has filed, in the Circuit Court at Kansas City, Mo., an application for a decree of incorporation. The promoters propose to build a transcontinental road along the line of the Washington road, from Washington, D. C., to Cumberland, Md., the Cumberland road to St. Louis, the Missouri State Highway, from St. Louis to Kansas City, and the Santa Fe trail from Kansas City to Santa Fe, N. M. The promoters, it is stated, will incorporate in all states touched by the proposed improvement.

Personal Notes

C. E. Dunwoodie has resigned his position as City Engineer of Port Arthur, Tex.

L. G. Youngs has been appointed Supervisor of State Roads in Erie County, Pa. Mr. Youngs will have jurisdiction over more than 250 miles of highways.

Daniel Ney of Jonestown, Pa., has been appointed a State Road Supervisor, and will have charge of operations on the road between Jonestown and Millersburg, Berk County, via Fredericksburg.

Richard H. Dickson has been elected Road Engineer for Dorchester County, Md. Mr. Dickson was formerly connected with the State Geological Survey.

C. O. Vandeventer of Leesburg, Va., has been appointed Assistant City Engineer of Baltimore, Md. Mr. Vandeventer was formerly engaged on the construction of the Croton Aqueduct in New York.

A. E. Foreman has been appointed Chief Assistant to the City Engineer of Victoria, B. C. Mr. Foreman was formerly secretary and manager of the Concrete Engineering and Construction Co., Ltd.

CONTRACT NEWS

ROADS AND STREETS

Contracts Pending

Date of letting	Reported issue of
7-6 Tiverton, R. I., macadam rd.....	7-6
7-6 Pittsburgh, Pa., rd. impt.....	7-6
7-8 Steelton, Pa., paving, curbing, etc.....	7-6
7-8 Lowellville, O., rd. impt.....	7-6
7-8 Dayton, O., st. impt.....	7-6
7-8 Rochester, O., rd. impt.....	7-6
7-8 Orange, Cal., rd. grader.....	7-6
7-8 Superior, Wis., paving, etc.....	7-6
7-8 Marshalltown, Ia., concrete paving.....	7-6
7-8 Marion, Kan., paving.....	7-6
7-8 Ft. Dodge, Ia., brick paving.....	7-6
7-8 Youngstown, O., paving.....	7-6
7-8 Huntington, Ind., rd. constr.....	6-29
7-8 South Bend, Ind., rd. constr.....	6-29
7-8 Fowler, Ind., stone rd.....	6-29
7-9 San Diego, Cal., st. impt.....	6-22
7-9 New York, N. Y., paving, etc.....	7-6
7-9 Lorain, O., repaving.....	7-6
7-9 Columbus, O., paving.....	7-6
7-10 New York, N. Y., paving, etc.....	7-6
7-10 New York, N. Y., broken stone, etc.....	7-6
7-10 Pittsburgh, Kan., paving.....	7-6
7-10 Crossville, Tenn., rd. constr.....	7-6
7-10 Fremont, Ill., st. impt.....	7-6
7-11 New York, N. Y., paving.....	7-6
7-11 Janesville, Wis., paving, etc.....	7-6
7-11 Toledo, O., repairing rds.....	7-6
7-12 Cincinnati, O., rd. oiling.....	7-6
7-12 Washington, D. C., grading, etc.....	7-6
7-12 Cincinnati, O., rd. impt.....	6-29
7-13 Monticello, Ill., rd. constr.....	7-6
7-15 Westfield, N. J., rd. impt.....	7-6
7-15 Idaho Falls, Id., rd. constr.....	7-6
7-15 Waverly, Ia., paving.....	7-6
7-16 Pittsburgh, Pa., rd. impt.....	7-6
7-18 Norfolk, Va., paving, etc.....	7-6
7-19 Wetumpka, Ala., paving, etc.....	7-6
7-19 Dayton, O., paving bonds.....	7-6
7-20 Cambridge, O., bridge, paving, etc.....	6-29
7-20 Cleveland, O., concrete culvert.....	7-6
7-23 Clinton, Ia., paving, etc.....	7-6
7-24 Struthers, O., paving bonds.....	7-6
7-25 Pikeville, Ky., brick paving.....	7-6
7-30 North Toronto, O., paving.....	7-6

BRIDGES.

7-8 Reading, Pa., bridge repairs.....	7-6
7-8 Dayton, O., bridge constr.....	7-6
7-8 Dayton, O., bridge.....	6-29
7-9 Fresno, Cal., bridges, etc.....	6-22
7-8 Sidney, Neb., bridge.....	6-29
7-8 Wellington, Kan., bridge constr.....	6-29
7-9 Springfield, Mo., bridge.....	6-29
7-9 Grangeville, Id., bridge.....	7-6
7-12 Beloit, Kan., bridge constr.....	7-6
7-13 Brainerd, Minn., bridge.....	7-6
7-15 Nundora, Wis., bridge constr.....	7-6
7-16 Fullerton, Neb., bridge.....	7-6
7-17 Muncie, Ind., bridge constr.....	7-6
7-20 Baylis, Ill., reinforced concrete bridge.....	7-6

ROADS AND STREETS.

Bids Asked and Prospective Work.

Wetumpka, Ala.—Bids will be received by the Cmsrs. of Elmore Co. until July 19 for grading and surfacing with gravel approximately four miles state aid road. Estimated cost \$8,000; W. S. Keller is State Highway Engr.

Long Beach, Cal.—The Bd. of Pub. Wks. has been instructed to advertise for bids for improving Broadway, between Daisy and Ocean Park Aves.; also portions of Mitchell Ave., Main St., Golden Ave. and Ocean Ave. with asphalt on concrete base, 5 ft. cement curbs, 18-in. corrugated iron pipe culverts.

Los Angeles, Cal.—Plans are being prepared by A. B. Waddington, Civil Engr., Tajo Bldg., Los Angeles, for subdividing two large tracts in the Eagle Rock Valley. One tract, which comprises about 115 acres, will be improved by the Home Builders, by grading, curbing, sidewalking and graveling. The other tract will be improved by the Suburban Development Co. by grading, sidewalking, &c.

Pasadena, Cal.—The City Council has ordered the improvement of Lincoln Ave., from Forest Ave. to Montana St., a distance of 1¼ miles, also for the improvement of Washington St., from Sunset to Sheldon Aves., a distance of ¾ miles. The work will include grading, and laying cement curbs and gutters. The work will aggregate about \$15,000. Bids will be called for soon.

San Francisco, Cal.—The Bd. of Pub. Wks. has granted permits for street work at the following locations, the expense to be borne by the property own-

ers: Crossing of Parnassus Ave. and Willard St.; 27th Ave., between Anza and Balboa Sts.; Gabrillo St., between 37th and 38th Aves.; Joost Ave., between Hamburg and Genessee Sts.; 25th St., between Dolores and Church Sts.; Gates St., between Eugenia and Powhattan Sts.; Cypress Alley, between 24th and 25th Sts.; Irving St., between 27th and 28th Aves.; intersection of Havelock and Arago Sts.; Havelock St., between Arago St. and San Jose Ave.; Paul Ave., between Crane and Wheat Sts.; Crane St., between Paul and Salinas Aves.; Havelock St., between Arago and Cloran Sts.; Carbillo St., between 37th and 38th Aves.; 10th Ave., between Moraga and Noriega Sts.; crossing of 27th Ave. and Anz St.

Santa Ana, Cal.—The City Council has accepted plans and specifications for the improvement of Bush St., from 5th to Washington Sts., a distance of eight city blocks, by paving with asphalt cement, and by curbing and guttering.

Pueblo, Colo.—D. P. Fraymon, Engr., is preparing estimates for paving several streets. Bids will be advertised for soon.

Washington, D. C.—Bids will be received until July 12 for grading certain streets in District of Columbia and laying cement sidewalks.

Idaho Falls, Ida.—The City Council will receive bids until July 15 for the construction of 36,180 sq. yds. of Bitulithic pavement, 1,560 sq. yds. of resurfacing old macadam and for combined concrete curbs and gutters. The estimated cost is \$99,590.

Benton, Ill.—The City Council is planning to expend \$68,000 paving city streets. Address the City Engr.

Decatur, Ill.—A resolution has been passed by the Bd. of Loc. Imps. for paving W. Decatur St., from S. Main to Greenwood Ave., and for paving Greenwood Ave., from W. Decatur St. south to the entrance of Greenwood Cemetery.

East Moline, Ill.—Resolutions have been adopted by the City Council providing for the paving of 2d Ave., from 1st to 7th St., with asphalt. The cost is estimated at \$36,430.

Fremont, Ill.—Bids will be received until July 10 for improving certain streets by curbing and paving with brick. Address Ralph R. Williams, City Clk.

Monticello, Ill.—Bids will be received by the Bd. of Highway Cmsrs. of Platt Co. until 1 p. m., July 13, for the construction of 5,592 sq. yds. of vitrified brick pavement with necessary curb and gutter and concrete culverts.

Pontiac, Ill.—The City Council will expend \$60,000 in street paving. Address the City Engr.

Rockford, Ill.—Ordinances are before the City Council providing for paving several streets with brick.

Westville, Ill.—The City Council will award contracts for two miles of cement paving. Address the City Engr.

Elkhart, Ind.—Petitions have been received by the Bd. of Pub. Wks. for paving with brick the first alley south of Redding Ave., from Main to 2d St., and for opening an alley near the N. Elkhart Addition.

Clinton, Ia.—The City Council will receive bids until 8 p. m., July 23, for the grading, paving and curbing of 3d St., from 2d Ave. to 3d Ave. Approximately 1,250 sq. yds. of concrete paving, 300 lin. ft. of concrete curb and 730 lin. ft. of drain tile will be required. R. C. Hart is City Engr.

Des Moines, Ia.—The City Council has authorized street paving in Des Moines.

Ft. Dodge, Ia.—Bids will be received until July 8 for paving certain streets with brick on concrete foundation. About 5,400 sq. yds. of paving is required. W. T. Tang is City Clk.

Glenwood, Ia.—The City Council will let contracts for improving streets by paving with brick. About \$7,500 will be expended. Address the City Engr.

Marshalltown, Ia.—Bids will be received until July 8 for seven blocks of concrete paving. W. H. Steiner is City Engr.

Perry, Ia.—Arrangements are being made for street paving in Perry. Address the City Engr.

Waverly, Ia.—Bids will be received until July 15 for 336,000 sq. yds. of paving and 1,500 lin. ft. of curbing. Bids will be received for mineral rubber pavement, Bitulithic pavement, asphalt con-

crete and other material. Address F. A. Lee, City Clk.

Columbus, Kan.—The City Council has passed an ordinance providing for the paving of Maple St., from the Frisco Depot to the square around the courthouse.

Marion, Kan.—Bids will be received until July 8 for seven blocks of paving, curbing and guttering. M. Williams is City Clk.

Pittsburgh, Kan.—Bids will be received by P. T. Jones, City Clk., until July 10, for 12,100 sq. yds. brick pavement, on concrete base, 4,700 sq. yd. concrete pavement, 9,100 sq. yds. double-course brick pavement and 8,100 lin. ft. concrete combined curb and gutter.

Pikeville, Ky.—Bids will be received by the City Council until July 25 for laying about 15,000 sq. yds. of brick paving, on a concrete base. Aurick & Haynes, Pikeville, are the Engrs. in Charge.

Laurium, Mich.—The City Council will advertise for bids for constructing about 200,000 sq. ft. of cement walks. Address the City Engr.

Duluth, Minn.—The City Council is planning to pave three streets. Address the City Engr.

Hannibal, Mo.—The Bd. of Pub. Wks. will award contracts soon for artificial stone curb, vitrified brick block paving and constructing sewers in several streets. Address W. H. Youse, City Clk.

Nevada, Mo.—The City Council will pave certain portions of Washington St. Address the Mayor.

Westfield, N. J.—Bids will be received until July 15 by the Town Council for 12,800 sq. yds. 6-in. and 3,200 sq. yds. 4-in. water-bound macadam; 600 sq. yds. macadam resurfaced; 6,000 lin. ft. concrete curb and gutter, and 45 lin. ft. concrete culvert.

Roswell, N. Mex.—Preparations are being made by the City Council for the construction of a boulevard around the mouth of the North Spring River, a distance of several miles.

New York, N. Y.—Bids will be received at the office of the Dept. of Parks, Arsenal Bldg., 5th Ave. and 64th St. until 3 p. m., July 11, for furnishing and setting curb stones and paving with Portland cement pavement the ends of the Park plots in 7th Ave., between 110th and 153d Sts.

Bids will be received by Alfred E. Steers, Pres. Boro. of Brooklyn, Room 2, Boro. Hall, until 11 a. m., July 10, for regulating and repaving with selected second-hand granite blocks on a sand foundation the roadway of Barbey St., from Sunnyside Ave. to Highland Boulevard. For regulating and repaving with Grade 1 granite on a concrete foundation the roadway of Delevan St., from Van Brunt St. to Columbia St.; for regulating and repaving with asphalt on a concrete foundation the roadway of Schenectady Ave., from Eastern Parkway to Union St., the roadway of Visitation Pl., from Dwight St. to Columbia St.; for regulating and repaving with Grade 1 granite on a concrete foundation the roadway of Wolcott St., from Conover St. to a line 700 ft. west of Ferris St.; for regulating and repaving with Grade 1 granite on a concrete foundation the roadway of 1st St., from Bond St. to Gowanus Canal; for regulating and repaving with granite, Grade 2, on a concrete foundation the roadway of 5th Ave., from Prospect Ave. to 25th St. (contract of John J. Durkin, declared by the President of the Borough of Brooklyn to have been unnecessarily delayed as per section "Q" of the contract.); for fencing lots on east side of 6th Ave., between 21st and 22d Sts., and various other streets.

Bids will be received by George Cromwell, Pres. Boro. of Richmond, at Boro. Hall, St. George, New Brighton, until noon, July 9; for furnishing all the labor and materials required for regulating and repaving with vitrified brick pavement of concrete foundation, the gutters of Sleigh St., from Lafayette Ave. to Nicholas Ave., and other streets, together with all work incidental thereto; for furnishing all the labor and materials required for regulating and repaving with wood block pavement on a concrete foundation the roadway of Richmond Terrace, from Stuyvesant Pl. to Nicholas St., together with all work incidental thereto; for furnishing all the labor and materials required for regulating and repaving with bituminous con-

crete pavement on present asphalt surface in the roadways, and with vitrified brick pavement on sand cushion in the gutters of Post Ave., from Richmond Ave. to Jewett Ave., and Livingston Pl., from Richmond Terrace to Davis Ave., together with all work incidental thereto.

Bids will be received by George McAneny, Pres. Boro. of Manhattan, City Hall, until 2 p. m., July 10, for repairing sheet asphalt pavements in the Boro. of Manhattan, together with the work incidental thereto—Section 1, bounded by Battery, North River, 10th St., and East River; for repairing sheet asphalt pavements in the Borough of Manhattan, together with the work incidental thereto; for regulating and repaving with asphalt, with close binder on a concrete foundation, the roadway of Houston St., from west side of Varick St. to east side of Hudson St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Houston St., from west side of Varick St. to the east side of Hudson St.; for regulating and paving with asphalt block pavement on a concrete foundation the roadway of Northern Ave., from north side 177th St. to south curb line of 181st St. (See Miscellaneous Item).

Canton, O.—The City Council has passed an ordinance providing for the paving of E. Lake St., from Market to St. Elms St.

Cleveland, O.—Bids will be received until July 20, for the construction of bridge per report No. 2945 concrete-culvert, Drake Rd., Royaltown Twp.

Columbus, O.—Bids will be received until July 9 for paving several streets with asphalt or brick. Address S. A. Kinnear, Clk. of the Bd.

Dayton, O.—Bids will be received at the office of the Dept. of Pub. Ser., at Dayton, until noon, July 8, for furnishing all the labor and material required for completing the Great Miami River Improvement, from the Washington St. bridge southward, to the C. C. & St. L. Railroad bridge.

Lowellville, O.—Bids will be received by the Trustees of Poland Twp. until July 8 for improving a portion of Poland and New Middleton Rd., about 1½ miles.

Lorain, O.—Bids will be received by the City Council until July 9 for the repaving of Broadway, from E. Erie Ave. to 31st St. Address L. A. Dawes, Dir. of Pub. Ser.

Powhattan Point, O.—Bids will be received soon, it is reported, for macadamizing 2.4 miles of road in York Twp., Belmont Co. Bids for this work were received on June 4, but were rejected.

Rochester, O.—Bids will be received until noon, July 8, by the VII. Council,

for the improvement of State St., by grading, draining and macadamizing the roadway. D. C. Mann is VII. Clk.

Toledo, O.—Bids will be received by the Cmsr. Lincoln Co., at Toledo, until July 11, for repairing roads. C. J. Sabzenbach is Co. Aud.

Youngstown, O.—Bids will be received until July 8 by the Mahoning Co. Rd. Cmsr. for paving 5,900 ft. of road with bituminous macadam.

St. Johns, Ore.—A resolution of intention has been passed by the City Council authorizing the improving of Burlington St., from Bradford to Hayes Sts., with standard concrete surface and 6-ft. cement sidewalks, at an estimated cost of \$14,112. The City Council also has under consideration the paving of a number of other streets.

McKeesport, Pa.—Bids will be received by the Allegheny Co. Cmsr. for improving 13 miles of county roads. The estimated cost is \$272,000. Address the Co. Engr.

Pittsburgh, Pa.—Bids will be received at the office of the City Contr., Municipal Hall, at Pittsburgh, until 10.30 a. m., July 6, for making public improvements as follows: Grading, regrading, paving, repaving, with sheet asphalt and blockstone, Grant Blvd., from Ridgway St. to a point 450.99 ft. northwestwardly, and

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 49,394 lineal feet of telford-macadam road (repair work) extending from the Blair township line at the bridge over Brush Run to the Catharine township line at Point View, under the Act of Assembly approved May 31, 1911; P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Hollidaysburg, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE REPAIR OF A SECTION OF ROAD IN BLAIR COUNTY, FRANKSTOWN TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 18,843 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: On Route No. 131, from Media to Wawa, in Delaware County, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request), marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 131 IN DELAWARE COUNTY."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 40,143 lineal feet of asphaltic

macadam road, 16 feet wide, situated as follows: Beginning at the Shamokin Borough line on Mt. Carmel street and passing through Johnson City, Mayesville, Kulpmont and Green Ridge to the Mt. Carmel Borough line, under the Act of Assembly approved May 31, 1911; P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Bloomsburg, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$5,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF SECTION NO. 4 ON ROUTE NO. 161 IN NORTHUMBERLAND COUNTY."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 16,300 lineal feet of asphaltic concrete road, 16 feet wide, situated as follows: From South Whitehall township line to end of Route No. 226 in Schnecksville, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and National Bank Building, Allentown, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 163 IN LEHIGH COUNTY, NORTH WHITEHALL TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for furnishing the State Highway Department with one thousand sign plates and sign posts, under the Act of Assembly approved May 31, 1911, P. L. 468.

Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia.

Each bid must be made upon a blank furnished by the State Highway Department and accompanied by a certified check in the sum of \$1,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) and marked: "PROPOSAL FOR FURNISHING ONE THOUSAND SIGN PLATES AND SIGN POSTS."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 8,354 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the toll gate on Clayton and Hereford road to the Montgomery County line in Berks County, Hereford Township, under the Act of Assembly, approved May 31, 1911; P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Allentown, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD IN BERKS COUNTY, HEREFORD TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 9,632 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: From the west borough line of Mercer, Station 25+92.1 and extending in a westwardly direction to a point near the property of H. W. White, Station 122+24.5, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Franklin, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD

Ridgway St., from Grant Blvd. to a point 165.90 ft. northwardly; grading, curbing and paving with sheet asphalt. Grotte St., from Lemington Ave. to Spencer St.; Hobart St. (formerly Munhall St.), from Murray Ave. to east line of Schenley Park; grading, curbing and paving with blockstone, Rebecca St., from the southerly line of Black St. to a point 600 ft. northwardly from the northerly line of Black St.; grading, paving and curbing with blockstone and brick, Hampshire Ave., from Cape May Ave. to Westfield St.; repaving with asphalt block or sheet asphalt, Devon Rd., from 463 ft. north of Forbes St. to Warwick Terrace, and Reynold Lane, from Devon Rd. to 161 ft. eastwardly; Thomas Blvd., from Linden St. to Dallas St.; Repaving with blockstone or asphalt block, Webster Ave., from Lawson St. to a point near Chauncey St., and from Perry St. to a point 65 ft. eastwardly; Colwell St., from 100 ft. east of Vine St. to a point near Dinwiddie St.; repaving with asphalt block or brick, Locust St., from Van Braam St. to Pride St.; Elm St., from Wylie Ave. to Foxhurst St.; repaving with blockstone, South 18th St., from Fox Alley to Wharton St.; S. 25th St., from Harcum Alley to Mary St.; repairs to South River Pier, S. 10th St. bridge crossing Monongahela River.

Bids will be received by R. J. Cunningham until July 16 for improving the fol-

lowing highways: Bakerstown and Culmerville Rd., six miles; West Run Rd., 4.1 miles; Spring Run Rd., 1.6 miles; Centre Rd., and extension .7 of a mile.

Steelton, Pa.—Bids will be received by the Council, at Steelton, until 7.30 p. m., July 8, for sub-grading, paving and curbing Pine St., from Front to Reading Sts. L. H. Sutton is Boro. Treas.

Tiverton, R. I.—Bids will be received until July 6, at the Town Clk's office for the construction of one mile of macadam road at Tiverton Four Corners. Drawings and specifications may be seen at the office of the Engr., 22 Bedford St., Fall River, Mass.

Crossville, Tenn.—Bids will be received by the Cumberland Co. Highway Cmrs., until 3 p. m., July 10, for the construction of 35 miles of roads on the Memphis-Bristol pike. Approximately 75,000 cu. yds. of excavation, 1,200 cu. yds. of rubble masonry and 100 cu. yds. of concrete masonry will be required. O. N. Monroe, Crossville, is Engr. in Charge.

Ft. Worth, Tex.—The Tarrant Co. Rd. Engr. is laying out routes for roads to be constructed by the county. The estimated cost is \$1,000,000.

Houston, Tex.—The City Council has authorized advertising for bids for the following street work: Houston Ave., from Washington Ave. to the White Oak

Bayou Bridge; German St., from the railroad tracks to Buffalo St.; Dallas Ave., from Main St. to San Felipe St.; Webster Ave., from Main St. to Crawford St., and of San Felipe St., from Dallas Ave. to Wilson St. Frank L. Dormant is City Engr.

Norfolk, Va.—Bids will be received by the Bd. of Control until 12.30 p. m., July 18 for regulating and paving 10th St., from Granby St. to Llewellyn Ave.; Colley Ave., from Westover to Armistead Ave.; 13th, 14th and 15th Sts., from Williams Ave. to Colonial Ave., and Tunstall Ave., from Landing St. to Gibbs Ave. W. T. Brooke is City Engr.

Spokane, Wash.—Plans have been prepared for the paving of Main Ave., from the Northern Pacific tracks to Division St.

Janesville, Wis.—Bids will be received by the Bd. of Pub. Wks., until July 11, for furnishing material and paving with brick 675 sq. yds.; 131 lin. ft. brick curb, 596 cu. yds. excavation, etc.

Superior, Wis.—Bids will be received until July 8 for paving certain streets with brick concrete or other material. A. F. Chadwick is Douglas Co. Aud.

North Toronto, Ont.—Bids will be received until noon, July 30, by F. How, Chn. Bd. of Wks., for the construction of pavements and storm sewers.

IN MERCER COUNTY, EAST LACKAWANNOCK TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,

Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 10,115 lineal feet of asphaltic macadam road, 16 feet wide, situated as follows: Extending from the Bristol-Falls township line to bridge over Pennsylvania Railroad in Bucks county, Falls township, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Philadelphia; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSALS FOR THE RECONSTRUCTION OF A SECTION OF ROAD IN BUCKS COUNTY, FALLS TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,
Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 8,048 lineal feet of asphaltic macadam road, 16 feet wide, situated as follows: Commencing at the cross roads at Emilie and extending to the Bristol-Falls township line in Bucks County, Bristol township, under the Act of Assembly, approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD IN BUCKS COUNTY, BRISTOL TOWNSHIP."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,

Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 13,735 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the Indiana county line to Punxsutawney on Route No. 63, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Franklin, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSALS FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 63 IN JEFFERSON COUNTY."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,

Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 3,760 lineal feet of brick block paving, 16 feet wide, situated as follows: From the Fallowfield township line to Station 29+20 and from Station 51+00 to Speers borough line at the bridge over Maple Creek in Washington county, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Washington, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 118 IN CHARLEROI BOROUGH, WASHINGTON COUNTY."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,

Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 14,807 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: From Station 122+24.5, near the property of H. W. White, and extending in a westwardly direction to the east line of Lackawannock township, Station 232+56, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Franklin, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 74 IN MERCER COUNTY."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department,

Harrisburg, Pa.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 9th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 10,756 lineal feet of asphaltic bituminous macadam road (penetration method), 16 feet wide, situated as follows: From end of present contract, Station 51+00, near the property of Mr. Stiman, to the south borough line of Chester Hill on Route 57, between Osceola and Philipsburg, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Clearfield Trust Building, Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "PROPOSAL FOR THE RECONSTRUCTION OF A SECTION OF ROAD ON ROUTE NO. 57 BETWEEN OSCEOLA AND PHILIPSBURG."

EDWARD M. BIGELOW,
State Highway Commissioner.

Bids Received and Contracts Awarded.

Little Rock, Ark.—A contract has been awarded to Woodsmall & McCarthy, of Little Rock, at \$19,948, for grading and paving Denison St., from 7th to 14th Sts., with Tarvia macadam, also for guttering, curbing and laying sidewalks.

Bushwick, Cal.—A contract has been awarded by the City Council to the Janet Cement Co., of Glendale, for the construction of cement sidewalks and curbs on 2nd, Olive and Angelino Aves.

Los Angeles, Cal.—The following bids were received by the Bd. of Pub. Wks. for improving Barlow St., from Cornwell to Soto St.: Walter Overell (a) \$3.25 per lin. ft. for grading and graveling; (b) 37c. per lin. ft. for cement curb; (c) 10c. per sq. ft. for relaying cobble gutter; (d) 15c. per sq. ft. for relaying vitrified block gutter; (e) 16c. per sq. ft. for cement gutter; (f) 11c. per sq. ft. for sidewalk; (g) 55c. per sq. ft. for granite block gutter; (h) 10c. per sq. ft. for reglazing, reglazing and reolling. O. L. Stevens (a) \$4.50; (b) 36c.; (c) 12 c.; (d) 29c.; (e) 16c.; (f) 11c.; (g) 48c.; (h) 10c.; W. F. Hewitt Co., (a) \$3.75; (b) 36c.; (c) 25c.; (d) 40c.; (e) 16c.; (f) 12c.; (g) 50c.; (h) 15c.

Cox & Mathews, of Pasadena, were low bidders for cement work on Mission Rd. Their bid was: (a) 11,254 sq. ft. of cement sidewalk at 10c.; (b) 1,294 lin. ft. of curb at 36c.; (c) 803 sq. ft. of driveway at 17c.; (d) 590 cu. yds. of excavating at 34c.; F. Odemar & Co. bid (a) 12c.; (b) 35c.; (c) 15c.; (d) \$200 and \$50 for curb bar.

The following bids were received for improving Broadway, between 7th and 9th Sts.: W. E. Nichols (a) 6½c. per sq. ft. for grading; (b) 39c. per lin. ft. for cement curb; (d) 17½c. per sq. ft. for cement gutter; (e) 50c. per sq. ft. for granite block gutter; (f) 13½c. per sq. ft. for sidewalk; S. Menefee (a) \$4.60 per lin. ft.; (b) 42c.; (c) 20c.; (d) 60c.; (e) 14c.

Vallejo, Cal.—The following bids were received by the City Council for the paving of Virginia, Sutter, Napa and El Dorado Sts.: City Street Imp. Co., 15,000 cu. yds. of excavation, 60c., \$9,000; 9,396 lin. ft. of concrete curb, 49c., \$4,604; 194,056 sq. ft. of Warrenite pavement, 20½c., \$39,781. Total, \$53,385; Barber Asphalt Paving Co. excavation, 55c.; curbing, 48c.; Warrenite paving, 19c. Total, \$51,276; Ralsch Imp. Co., excavation, 78c., \$11,700; curbing, 174c., \$4,416; Warrenite, 17½c., \$33,959. Total, \$50,075.92.

Wilmington, Cal.—The Standard American Dredging Co. bid \$4.95 per lin. ft. for grading W. 1st St. and \$5.95 per lin. ft. for grading D. E. F. G. H and J Sts., and W. 2nd, 3rd and 4th Sts., Wilmington.

Atlanta, Ga.—Contracts have been awarded by the General Council for paving as follows: 20,000 sq. yds. creosoted wood block on Marietta St., to T. D. Meador, Jr., of Atlanta, at \$2.74 per sq. yd., and 28,000 sq. yds. brick pavement on Highland Ave. to Nichols Constr. Co., Atlanta, at \$2.24 per sq. yd. R. M. Clayton, Engr. of Constr.

Wilmington, Del.—Bids were received for road improvement and contracts awarded as follows: Road from Ginn's towards Blackbird, 6,400 ft., to the Horrigan Contr. Co., for \$3,300. It is to be a limestone road. The Kirkwood Rd. towards St. Georges, a distance of 8,200 ft., to John A. Clark, for \$10,400. This road is to be built of Birdsboro trap rock. The road between Tybout and Bear Station, to John A. Clark, for \$7,100. It also is to be built of Birdsboro trap rock.

Pocahontas, Id.—The City Council has awarded a contract to Strange & Maguire Co., Salt Lake City, Utah, for paving 20 blocks in the business section with Bitulithic at \$86,636. Other bidders were: Wiles Constr. Co., \$89,890 and \$88,257; James Kennedy Constr. Co., \$90,117 and \$87,504; Warren Constr. Co., \$91,712 and \$88,773; and R. M. Bardsen & Co., \$96,591 and \$93,325.

Silvis, Ill.—A contract has been awarded to the Tri-City Constr. Co., of Davenport, at \$60,750, for paving 1st Ave., from 1st to 16th Sts.

Indianapolis, Ind.—A contract has been awarded by the Bd. of Pub. Wks. to the Union Asphalt Constr. Co. for paving with bituminous concrete E. New York St., from a point 70 ft. west of Gale St. to Emerson Ave. The contract price is \$2.20 a lin. ft. on each side of the street. The total cost of the improvement will be about \$24,000.

Burlington, Ia.—The City Council has received bids for repaving stretches of

Main and Jefferson Sts. as follows: D. J. Ryan & Co., Davenport—curb, 70c.; grading, 55c.; brick, \$2.11; wood block, \$2.78. Young & Buesscher—curb, resetting, 20c.; grading, 40c.; brick paving, \$2.12; wood block, \$2.84. Burlington Constr. Co.—curb, 60c.; grading, 60c.; brick paving, \$2.04; wood blocks, \$2.77.

Louisville, Ky.—Contracts were awarded by the City Council for the improvement of four streets with Granitoid walks, and curbs and vitrified brick gutters, as follows: Pearl St., Front to Court Ave., and Watt St., Market to Court Ave., William O. Sweeney & Co.; Wall St., Front to Court Ave., Thomas F. O'Neill; Locust St., Front to Court Ave., William T. Ingram.

Baltimore, Md.—A contract has been awarded to the David M. Andrews Paving Co., Baltimore, at \$74,000, for paving with Belgian block the portion of that thoroughfare lying between Bath and Hillen Sts.

Concord, N. H.—A contract has been awarded to John A. Gaffey, of Medford, Mass., by the Highway Dept. of New Hampshire, for constructing a macadam road in Rochester at \$16,274, and for building one mile of trap rock road in Bow, at \$3,985. The Dept. also awarded a contract to W. Gordon of Franklin for the building of a macadam road in Tilton, at \$7,559.

Springfield, Mass.—A contract has been awarded to the United Wood Preserving Co. for supplying 12,800 cu. yds. of wood block paving. The block is to be laid on Willow, Sanford, Court and Chestnut Sts. and a number of other streets.

Bemidji, Minn.—The City Council awarded a contract to Goodman & Lottuud, at \$1.10 per sq. yd., for paving the following streets: 4th St., from Minnesota to America; 3rd, from Minnesota to America; 2nd, from Beltrami to Bemidji, and 5th, from Minnesota to Beltrami.

Havelock, Neb.—A contract has been awarded to J. C. Ries & Co., of Havelock, for the construction of 10,000 sq. ft. of cement sidewalks and concrete street crossings, at 10c. and 17c., respectively.

Omaha, Neb.—A contract has been awarded to the Midwest Engg. Co., 301 McCague Bldg., Omaha, at \$2.04 per sq. yd., for the construction of Purlington brick pavement on Burlington Ave.

Jersey City, N. J.—A contract has been awarded to O'Reilly Bros., 90 Neptune Ave., Jersey City, for the improvement of Randolph Ave., from Bramhall Ave. to the Newark & N. Y. R. R.

Westfield, N. J.—A contract has been awarded to James C. Parks, at \$17,249, for paving. Other bidders were: Weldon Contr. Co., Rahway, \$18,983; Liddle & Pfeiffer, Perth Amboy, \$19,578; Mele & Bruno, 192 Market St., Newark, \$23,212.

Rochester, N. Y.—The following contracts were awarded by the Bd. of Contract and Supply for street improvement: Jay St., asphalt pavement, Rochester Vulcanite Co., \$35,055; Gibbs St., asphalt pavement, Whitmore, Rauber & Vicinus, \$10,977; Colby St., asphalt pavement, Whitmore, Rauber & Vicinus, \$6,291; Webster Ave., asphalt pavement, Whitmore, Rauber & Vicinus, \$17,540.50; Pennsylvania Ave., brick pavement repairs, Aikenhead, Bailey & Donaldson, \$1,347.50; Humboldt St., cement walks, J. Petrossi Co., \$739; Barkley St., surface sewer, Aikenhead, Bailey & Donaldson, \$153.50; Dudley St., cement walks, Passero & Petrossi Co., \$151.50.

Arlington, O.—A contract has been awarded to W. A. Biblen & Son Co., Arlington, at \$3,860, for the construction of Edson line road in Eagle Twp.

Norwalk, O.—A contract has been awarded to the Modern Constr. Co., Fremont, at \$12,496, for the grading and laying of concrete on 1½ miles of road, which will be known as the Fairfield Rd. and will be located in Bronson Twp.

Upper Sandusky, O.—The contract has been awarded to Disher Bros., Upper Sandusky, at \$11,994.75, for grading and paving with a 'waterbound macadam, the Uncapher Rd., in Merselles Twp., Wyandot Co. The proposed improvement will be 10,593 ft. long, 10 ft. wide, and was estimated to cost \$12,123.

Richwood, O.—A contract has been awarded to W. H. Ringwald & Sons, of Chillicothe, for the paving of Bomford St., from the west line of the N. Y. P. & O. R. R. right of way to the intersection of Pearl St., with vitrified brick.

Xenia, O.—A contract has been awarded to the Wilson Engg. & Constr. Co., Xenia, at \$1,402.50, for furnishing and placing, as directed, 850 cu. yds. of loose limestone on the Columbus Rd., in Cedarville Twp., Greene Co. The estimated cost was \$1,402.50.

Portland, Ore.—A contract has been awarded to Glebisch & Joplin, Portland, at \$91,907, for laying Westrumite pavement on nine streets. The following are the streets to be paved, and the contract price: Schofield St., from Delaware to Patton, \$19,804; Terry St., from Patton to Aubrey, \$8,023; Watts St., from Delaware to Patton, \$16,360; McClellan St., from Brandon to Fenwick, \$7,819; Russell St., from Derby to Patton, \$7,773; Chatham St., from Lombard to Farragut, \$3,774; Willis Blvd., from Brandon to Fenwick, \$7,930, and Argyle St., from Brandon to Fenwick, \$8,093.

BRIDGES.

Bids Asked and Prospective Work.

San Diego, Cal.—The City Council has authorized W. M. Rumsey, City Engr., to prepare plans for a reinforced concrete bridge to be constructed across the San Diego River at Old Town. The work is estimated to cost \$16,000.

Denver, Colo.—The two high iron bridges at Larimer and Market Sts. will be replaced by flat steel or concrete bridges of one span.

The Bd. of Pub. Wks. will build a viaduct at West Colfax, it is reported. Address the Secy. of the Bd.

Grangeville, Ind.—Bids will be received by the Cmrs. of Idaho Co., until July 9, for constructing a bridge over Cottonwood Creek.

Baylis, Ill.—Bids will be received until July 20, by the State Highway Cmn., for the construction of a reinforced concrete bridge between Pike and Adams Cos.

Chicago, Ill.—The City Council will expend \$30,000 on construction of a temporary bridge over river at Madison St.

The Cmrs. of Pub. Wks. are contemplating the construction of a \$400,000 bascule, two deck bridge at Lake St.

Edwardsville, Ill.—The Wood River Highway Cmrs. are preparing to erect a concrete bridge in Madison Co. It will be 90 ft. long and will span Wood River at the Henry Klopmeier farm. The Cmrs. will ask for county aid in building the structure. Address the Madison Co. Surv.

Rockford, Ill.—The Winnebago Co. Spvrs. have appropriated \$35,000 towards the construction of a \$50,000 county bridge across Rock River. Address the Co. Engr. at Rockford.

Albion, Ind.—It is reported that the Noble Co. Cmrs. have in contemplation the construction of a concrete bridge over Elkhart River, to cost \$12,000.

Indianapolis, Ind.—The City Council will erect a 90-ft. reinforced concrete arch bridge, to cost \$10,000. Contracts will be let by the Bd. of Pub. Wks., City Hall. Address Henry W. Klausmann, City Engr.

Muncie, Ind.—Bids will be received until July 17 for furnishing material and constructing the following bridges: Bridges known as the Lesh No. 2, Hurley, Dudleston, Fullhart, Whitney and F. H. Dittinger, six bridges, in all, to be built.

Beloit, Kan.—Bids will be received until July 12 by the Cmrs. of Mitchell Co. for repairing ten bridges.

New Orleans, La.—The Claiborne and Magnolia bridges over the new Basin Canal will probably be repaired or new structures will be erected.

Denton, Md.—It is stated that an iron drawbridge is to be constructed over Choptank River at Denton.

North Billerica, Mass.—Plans for the construction of a bridge, estimated to cost \$21,300, have been prepared by J. R. Worchester & Co., Consult. Engrs., Boston.

Brainerd, Minn.—Bids will be received until 3 p. m., July 13, by the Aud. of Crow Wing Co., for building a bridge 283 ft. long, of three spans, across Crow Wing River.

Fullerton, Neb.—Bids will be received at Fullerton, until 10 a. m., July 16, for the construction of a steel bridge across the Loup River, located about one mile south of the town of Genoa. The bridge will have five 136-ft. spans, high-truss, with concrete piers and abutments, with alternate designs of piers and floors and extra materials, including earthwork.

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607 Security Building, Chicago

Akron, O.—It is reported that a private corporation is being organized to build a viaduct at N. Main St.

Dayton, O.—Bids will be received by the Dept. of Pub. Ser., until noon, July 8, for constructing a 150-ft. steel truss bridge, in connection with levee work.

Sidney, O.—A contract has been awarded to Wesley Wleal, Sidney, at \$1,074, for the construction of a retaining wall along the Botkins Pike in Dinsmore Twp., Shelby Co.

Litrope, Pa.—The Westmoreland Co. Engrs. are preparing plans for a steel frame reinforced concrete bridge to be erected over Loyalhanna Creek. The bridge will be 240 ft. long and 50 ft. wide.

Reading, Pa.—Bids will be received until 10 a. m., July 8, for repairing three bridges.

Washington, Pa.—It is proposed to repair bridge over Monongahela River to Spiers at a cost of \$20,000. Chaney & Armstrong, of Washington, are Engrs.

Kingston, Ont.—The Government will receive bids shortly for the construction of the temporary bridge over the Cataragui River, to take the place of the present structure until such time as the new bridge is completed.

Bids Received and Contracts Awarded.

Los Angeles, Cal.—The Mercereau Bridge & Constr. Co., Pacific Electric Bldg., was lowest bidder at \$18,690 for the construction of a concrete bridge and embankments for approaches over the Los Angeles River, on San Fernando Ave., in the Lankershim Road Dist. The other bids received by the Bd. of Suprvs. were: Putnam-Stone Contr. Co., \$20,847; Russell-Green-Foell Co., \$27,892.

San Jose, Cal.—The San Jose Water Co. has awarded the contract to W. L. Gillham, 678 S. 3rd St., for constructing a steel bridge over the Guadalupe River, at \$1,850.

Santa Ana, Cal.—A contract has been awarded to Chas. Steffen, Granger Bldg., San Diego, at \$16,215, for the construction of a three-hinge type reinforced concrete bridge over the Santa Ana River.

Ventura, Cal.—The following bids were received by the Ventura Co. Bd. of Suprvs. for the construction of a 1,000-ft. reinforced-concrete bridge over the Ventura River, near Ventura. Plans and specifications by Thomas & Post, Hibernian Bldg., Los Angeles; S. M. Kern, \$49,600; Portland Concrete Co., Portland, Ore., \$52,238; Los Angeles Planing Mill Co., \$59,600.

BONDS.

Dayton, O.—Bids will be received until July 19 for the purchase of \$20,400 interest-paying bonds.

Struthers, O.—Bids will be received until July 24 by the VII. Clk. for \$15,443 paving bonds. Ira Eisenbaum is VII. Clk.

Upper Sandusky, O.—Bonds to the amount of \$28,000 will be sold on July 18. The proceeds will be used in improving roads in Richland Twp.

Bay City, Tex.—An election will be held on July 20 by the Cmra. Court of Matagorda Co., for the purpose of deciding the question whether or not bonds to the amount of \$100,000 will be issued.

Cameron, Tex.—An election has been ordered for July 23 to vote on the issuance of \$200,000 in good roads bonds in Precinct No. 4, Milam Co.

MISCELLANEOUS.

Orange, Cal.—Bids will be received until July 8 by the City Clk. for furnishing a reversible road grader. O. W. Halman is City Clk.

New York, N. Y.—Bids will be received at the office of the Dept. of Parks, Arsenal Bldg., 5th Ave. and 64th St., until 3 p. m., July 11, for furnishing and delivering in the Boro. of Queens, one 12-ton steam roller.

Bids will be received by George McAneny, Pres. Boro. of Manhattan, City Hall, until 2 p. m., July 10, for furnishing and delivering 3,500 cu. yds. of broken stone and screenings divided approximately as follows: 1,750 cu. yds. of 1½-in. broken stone, 1,750 cu. yds. of screenings.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

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NEW YORK, JULY 13, 1912

Number
2

Country Highways in Missouri

Bulletins 14 and 15 of the highway department of the Missouri State Board of Agriculture are devoted to the subject of country roads, the title of bulletin 14 being "The Construction of Country Roads" and bulletin 15 "The Effect of Country Roads."

Several pages of bulletin 14 are devoted to road plans, and contain expert advice on the construction of various types of roads suitable for rural traffic. This division of the bulletin is opened with the statement that the roads should be built to meet the demands of travel coming upon them, and that it follows that not all roads should be gravelled, stoned or oiled, nor should they all be of earth, no one type of road being adaptable to all classes of traffic nor suitable to all conditions.

Advice is given concerning the proper methods of constructing earth roads and the use of straw and sawdust therein. The statement is made that any width of metalled roadway between 10 and 15 ft. represents cost without efficiency. The average distance between outside tracks of passing farm vehicles is about 12 ft., and a 12-ft. roadbed is, therefore, the most undesirable of any. Ten feet is sufficiently wide for one vehicle and to give enough body to the roadbed, while 15 ft. is the least width allowable for the convenient passage of two vehicles. It follows that a 10-ft. roadbed is as wide as a single track road should be and 15 ft. is as narrow as a double track should be, for value and economy.

Sample profiles and cross sections of earth roads of various width are shown, as are cross sections of stone roads and an explanation of the various terms of road construction and their usages. The running of levels and the use of profiles, grading and various other engineering operations necessary for the construction of country roads of different types are explained. Considerable cost data is also furnished.

The second division of the bulletin is given to the practical consideration of location, construction and maintenance. It is stated that in some parts of the state of Missouri road making is largely a question of location, and that many improvements could be made by relocating the road for a short distance. In other instances a better bridge site could be obtained, grading eliminated and a better foundation provided by a slight change in the location of the road without detriment to farm improvements. The cost of the construction of roads may be considerably lessened by proper location. One of the foremost principles of road building which is involved in both location and construction is the reduction of grades. Assuming that the drawing power of a horse on the level is 1,000 pounds, it is stated that while he can draw 900 pounds up a 1 per cent. grade, he can draw but 250 pounds up a 10 per cent. grade.

The two main principles to be considered in construction, whatever kind of road is being built or whatever materials, methods or plans are used, are drainage and wearing surface. Preeminence is given to drainage, this being considered the most important feature of road construction in every sense. Drainage is discussed under two heads, surface and underdrains, and advice is given as to the methods

of obtaining satisfactory conditions under these heads. Considerable space is devoted to a description of underdrains, constructed of tile, logs or stone. Tile of not less than 4 ins. in diameter is particularly recommended.

The various classes of roads are taken one at a time and discussed, and various tables are included.

The cost of building rock roads is given in extensive detail from the quarrying of the rock to the completing of the finished road. The Missouri State Engineer's specifications for the application of bituminous binders are given practically in full and cost data are furnished in this connection, and in other parts of the book.

Machines, and the use of the road drag for country roads is dwelt upon exhaustively in the closing pages of the bulletin.

Bulletin 15, which treats of the effect of country roads, devotes eight pages to a history of the wagon road in general, in the United States, and in Missouri.

Under the last heading it is stated that the first settlers of Missouri blazed trails from the watercourses into the most remote sections. The oldest roads in Missouri are along the eastern border from St. Louis to Arkansas and are developments of the old Indian trails. Kings highway, or the Camino Real, so named by the Spaniards, is the best known of these. It extends from St. Louis southward through De Soto, Ste. Genevieve, Perryville, Cape Girardeau, Sikeston, New Madrid, and Caruthersville. This is the trail over which the explorer, De Soto, is reported to have traveled from Arkansas to Cape Girardeau. It was opened as a highway in 1808, by the Territorial Assembly of the District of Louisiana, of which the state of Missouri was then a part. An act authorizing its opening was signed by Meriwether Lewis, Governor of Louisiana and Missouri's first great road builder. Other roads are mentioned, among which is the old state road, sometimes called the Old Military road from St. Louis to Jefferson City, the Old Wire Road from Gray's Summit to Springfield thence by Mt. Vernon and Granby to Neosho and the Salt River Road from St. Charles to the mouth of the Des Moines River.

It is stated that numerous other roads were laid out by the territory and the state up to the Civil War. These roads were not built by the state, but were surveyed, the rights of way established and cleared, and in some instances small bridges were provided by special acts of the Legislature. The rights of way were all 60 ft. wide.

Some of the earliest roads of Missouri were corduroy. Toll roads were constructed in a number of the old river counties, and still exist in Lincoln and Boone counties.

According to the bulletin road bonds which have been issued in Missouri between May 1, 1911, and May 1, 1912, are as follows: Lafayette County, \$125,000; Jefferson County, \$30,000; Boone County, \$100,000 in one section and \$20,000 in another; Callaway County, \$105,000; Greene County, \$27,000; Barry County, \$7,000; New Madrid County, \$93,000; Lawrence County, \$50,000; Dade County, \$30,000, in one section and \$17,000 in another; Pettis County, \$200,000 and Laclede County, \$50,000.

A table of tractive force on the various kinds of road surfaces is given showing that the tractive force of brick is 15 to 40 pounds, asphalt 30 to 70, wood block 30 to 80,

macadam 20 to 100, gravel 50 to 100, earth 50 to 200, sand 100 to 500.

The resistance per ton on a level, dry, deep sand road is said to be equal to that on dry, hard earth road with a 12 per cent. grade.

The cost of haulage on country roads of different varieties is given in the table showing that the cost over the bad roads is from 20 to 30 cts. per ton-mile and on good roads of rock or firm, smooth earth surface, 7 to 10 cts. per ton-mile.

The relationship of good roads to the prosperity and welfare of the farmer is illustrated by quotations from government bulletins, showing the length of the haul of various crops in other states in the country and the cost per ton mile upon the different classes of pavements.

With these quotations as a base it is shown that Missouri provides one-fortieth of the tonnage of the crop output of the country or about 50,000,000 tons, annually moved over the country roads, with an average haul of 9 miles at an average cost of 24 cents per ton mile, and could save about \$5,000,000 annually in transportation by improving these roads.

It is estimated that one-fourth of the roads of Missouri carry 80 to 90 per cent. of the traffic. At a conservative estimate, therefore, 25 per cent. of the roads are main roads, and in order to realize the benefits 27,000 miles should be improved. Five per cent. are now classified as improved roads, leaving about 20,000 miles unimproved. It is shown that this could be done at an average cost over the state of \$2,500 per mile or a total cost of \$50,000,000. A state bond issue for state aid of \$17,000,000, running 17 years, the state paying one-third, would accomplish it.

Illustrations are given demonstrating the relationship of illiteracy and bad roads in the various States. A pertinent argument in this direction is adduced to the effect that of the thirty counties in Missouri showing the greatest increase in population between 1900 and 1910, twenty-seven have some improved roads, the percentage of the roads improved over the thirty counties being 9 per cent., while the thirty counties in Missouri showing the greatest decrease in population for the same period average about 15 per cent., only eight having any improved roads, and the percentage of improved roads in the thirty counties being only seven-tenths of one per cent.

An interesting chapter on the height of wheels and the width of tires is given. The statement is made that numerous tests of the draft of wide and narrow tired wagons have been made during the last two years on macadam, gravel and earth roads in all conditions, and on meadows, pastures, and plowed fields, both wet and dry. The draft has been determined by means of a self-recording dynamometer. The load was in every trial the same; that is, 2,000 pounds.

In a large majority of cases the draft was materially less when tires 6 inches in width were used than when the tests were made with tires of standard width, 1½ inches. A detailed statement of these tests is given. A chapter devoted to road administration contains a description of the system of working convicts on the public roads.

Work on the New Montreal-New York International Highway

It is stated that the Quebec Provincial government expects that the so-called King Edward Highway from Longueuil to the Inter Colonial boundary at Rouses Point will be completed before October. This is a part of the Canadian section of the Montreal-New York international Highway.

It is also the intention of the Provincial Government to rebuild the Chambly road, which is popular on account of its scenic attractions.

The King Edward Highway will be about 40 miles long

and the cost of the construction will average about \$6,000 a mile, a total of about \$250,000. The work is being done by the Provincial government, but the work on the Chambly road, which will be officially known as the International Road, will probably be done by contract to determine which system is the most economical.

Twelve separate plants of road making machinery have been set up along King Edward Highway, and 80,000 loads of stone have already been hauled and distributed to 24 points ready for the crusher.

The equipment includes 40 stone wagons, 11 stone crushers, seven engines, 13 road graders, and seven watering carts.

The new road will be macadam all the way with some of the sections covered with a coating of tar and sand. Concrete culverts will be inserted throughout the entire length of the road. Work has already been started on five sections, two at Lacolle, one at St. Philippe, one at Napierville, and one at St. Constant.

Proposed Street Work in Rock Island, Illinois

The Board of Local Improvements of Rock Island, Ill., has voted to recommend to the City Council the adoption of ordinances for the paving of Third Ave., between 15th and 24th Sts.; 18th St., between Third and Fourth Aves., and 38th St., from Seventh to Eighteenth Aves. It is estimated that the two improvements will cost \$94,000, the 38th St. job alone representing an expenditure of \$61,000.

Brick is specified in both cases in the recommendation of the Board of Local Improvements, but it is said that there may be a change in favor of asphalt in the Third Ave. plan. The specifications for the work on Third Ave. and 18th St. call for the laying of the surface on a concrete foundation.

The recommendation for the paving of 38th St. is the third action by the board to that end. The contract has been awarded twice, but the contractors have refused to undertake the work on the ground of legal objections to the preliminary proceedings, making it necessary to start over again.

The board in its recommendation includes the reduction of the width of the street from 36 to 30 ft., and change of grade from 7 to 3½ per cent. This reduction of grade will mean more excavation, but the narrowing of the street will equalize the cost.

The paving is to carry with it the construction of the proposed 38th St. line of the Tri State Railway Co., and under the ordinances governing the company's operations, it will bear the burden of cost for a material part of the excavation. It is said that the Board hopes to get the proceedings through the Council so that the work on the excavation may begin this year.

New Road Work in Pennsylvania

The State Highway Department of Pennsylvania is advertising for bids to be opened July 30 for approximately 17½ miles of new highway work, under the Sproul Highway act.

Of this work, 43,296 lin. ft. of road will be of bituminous macadam, 16 ft. wide, and 23,840 ft. will be of the same material, 14 ft. wide. A strip, 7,400 ft. long and 16 ft. wide will be constructed of telford macadam; 9,343 lin. ft. will be of brick, 16 ft. wide, and 8,077 lin. ft. will be of brick, 14 ft. wide. The cost of the entire work will be between \$400,000 and \$500,000.

A greater part of the brick pavement will be in Erie County and the rest in Allegheny County. The telford macadam road will be built in Bethel Township, Lebanon County. The bituminous macadam roads will be distributed among Clinton, Adams, Allegheny and Blair Counties.

Proposed Road Work in Ontario

As a result of agitation on the part of citizens of Toronto and Hamilton, Ontario, which culminated June 21 in a conference held under the auspices of the Ontario Good Roads Association at the Oakville Club, Oakville, it seems probable that a paved road will be constructed along the shore of Lake Ontario, between Toronto and Hamilton.

The conference was participated in by representatives of the councils of the two cities, the wardens of the counties interested, and others, and a resolution was passed to the effect that the meeting placed itself on record as favoring the construction of such a road along the lake shore by way of Brant House, Maple Avenue and the Plains Road into Hamilton; the cost to be borne by the provincial and dominion governments, the two cities and the counties of Wentworth, Halton, Peel and York. The meeting was presided over by Major T. L. Kennedy, President of the Ontario Good Roads Association.

While the speakers at the meeting almost without exception favored the project, they did not arrive at a unanimous conclusion regarding the cost. According to an estimate by W. A. McLean, Provincial Engineer of Highways, the total expenditure necessary would be about \$600,000. Mr. McLean arrived at this figure by calculating the cost at the rate of \$1.50 per lin. ft. While this was considered reasonable, there was some question as to how it should be divided among the different municipalities. The discussion was closed by a motion that a representative committee consisting of the four county wardens, two representatives each from the City Councils of Toronto and Hamilton, The Canadian Manufacturers' Association, the Boards of Trade, and the reeves of other municipalities interested, be appointed to wait upon the Provincial Government with the object of discussing their portion of the cost. This motion was adopted.

It was not decided what class of pavement should be used and a committee composed of Messrs. W. A. McLean, E. A. James and W. D. Flatt, Hamilton, Ontario, and Major T. L. Kennedy, was appointed to select a suitable material.

The various speakers referred to the possibilities which the construction of the road would open up. It was said that the construction of such a highway would revolutionize the transportation problem between the two cities, would increase property values and would materially reduce the cost of living by bringing the fruit farmer, the market gardener and other produce growers nearer the consumer.

It is said that another conference will be held within the next few weeks to receive the reports of the committees.

The question of good roads is also being carried forward in Essex County, Ontario, the citizens of that county having set in motion a plan for financing a county good roads system, which is said to differ materially from the usual procedure in such cases. The cost of the proposed system is estimated to be about \$300,000. The plan calls for the making up of this amount by a contribution of \$100,000 from the county, \$100,000 from the provincial government, in accordance with its customary practice of granting one-third the cost in such cases, \$50,000 from the cities of Windsor and Walkerville, and \$50,000 from the Dominion government. This proposal that the two urban municipalities make a special contribution towards the cost of county roads is interesting, as it is said to be the first proposition to be made in pursuance of the highway act of the last session of the Parliament. It marks the advance of the small urban municipalities as a factor in the work of roadway construction in suburban districts. It is not known whether or not Windsor and Walkerville will contribute their shares on such a basis.

Work on the reclamation of the comparatively unsettled settlements in northern Ontario has already been taken in

hand by the Dominion government. Pending the appointment of permanent officers and the organization of a department having special charge of the general plans, the government has temporarily appointed J. F. Whitson, chief of the surveys branch, as an officer, under the highway act of the last session of the Dominion Parliament, for the purpose of carrying on the work of road construction in that region.

Mr. Whitson is said to be a practical man, thoroughly familiar with Northern Ontario, and to possess a knowledge of the territories best adapted for immediate settlement and the methods of laying out the roads to the best advantage for the opening up of townships.

This territory is at present settled only by pioneers who have penetrated the wilderness of the so-called Clay Belt in the remote section of Northern Ontario. The demand for good roads is imperative, and their establishment will hasten the development of that part of the Dominion as no other factor could.

Mr. Whitson has been in Northern Ontario for some time engaged in organizing his staff and laying out the roads to be constructed, and it is expected that the actual work of construction will be commenced shortly. Particular attention will be given to opening up the country along the line of the Temiskaming and Northern Ontario Railway and along the Transcontinental Railway. New roads will be constructed through the townships already partly settled, and it is said that the government intends to go further than this and to open the way for the settler rather than follow him. It is understood that several new townships will be opened for settlement, and that they will be made accessible by the building of government roads. It is the policy of the government to build permanent roads and not makeshift trails.

In the townships along the government line and in the new districts along the Transcontinental Railway, the government will spend in the neighborhood of \$350,000.

State Road Work in New Jersey

According to a statement by State Supervisor of Public Roads Robert A. Meeker of New Jersey, there are now actually under construction in the northern New Jersey counties 83 miles of roads at an aggregate contract cost of \$983,000, of which the state is paying \$327,000, or one-third of the total, the counties paying the rest.

In Essex County several sections of road, ranging from $\frac{1}{4}$ mile to over $3\frac{1}{2}$ miles, are under construction. In Sussex County the Hamburg road is being constructed to connect the old municipality of Deckertown with an improved road south over the Hamburg mountain. This road is practically finished with the exception of two bridges with their approaches.

In Bergen County the two sections of the Franklin turnpike are well under way, and when completed will give an improved road to the New York state line. The road along Sylvan Avenue in Tenafly and Alpine in the same county, a further extension of a drive over the Palisades, is also well advanced in construction.

There are nearly nine miles of roads being built in Middlesex County including the South River and New Brunswick Road, the Highland Park and Bonhampton Road, the Franklin Park and Kingston Road and Main St., Bound Brook. The Franklin Park and Kingston Road, about $\frac{1}{4}$ mile long, completes the gap in improved roads between New Brunswick and Trenton by way of Princeton, and is, therefore, an important through state road.

State roads are also being built in Somerset, Hunterdon, Passaic, Hudson, Union and Warren Counties. In addition to the roads already under construction it is stated that within the next 60 days contracts will be awarded for many other roads.

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New Series
Vol. IV., No. 2

JULY 13, 1912.

New Roads in Spain

According to a recent statement in the Daily Consular and Trade Reports, the Spanish government is contemplating the construction of 7,000 kilometers of new roads among the 45 provinces in the country.

Roads in Spain are classed as "State," "Provincial," and "Municipal" according to which of the three government divisions supports them. There are in the whole country under the different classifications the following: "State" roads, 42,715 kilometers; "Provincial" roads, 8,000 kilometers; "Municipal" roads, 20,000 kilometers. State roads are shown to be by far the most important.

The four provinces of Alava, Guipuzcoa, Vizcaya and Navarra, which in addition to the 45 above mentioned, complete the 49 into which the country is divided, manage their own road building. Their roads are the best in Spain and are perhaps as good as any in Europe. The number of kilometers in each of the four is as follows: Alava, 517; Guipuzcoa, 603; Vizcaya, 513; Navarra, 1,963.

Those provinces having any important number of kilometers of provincial roads, which are included in the smallest of the three classes, are: Barcelona, 511; Burgos, 361; Coruna, 236; Jaen, 134; Madrid, 442; Malaga, 110; Orense, 157; Oviedo, 119; Pontevedra, 170; Segovia, 315; Tarragona, 153; Valencia, 297; Valladolid, 685.

Work to Begin Soon on California State Highway System

Bids for the construction of the first links in the California state highway system, under the \$18,000,000 bond issue, were opened June 25, and the work will be started soon.

The contracts awarded at that time comprise four of the projects contemplated in connection with the system and call for the construction of about 37 miles of highway. The aggregate cost of the work is about \$295,000, this being considerably below the estimate of the state engineer.

One of the four sections is a stretch of 5.4 miles from South San Francisco to Burlingame. The road is to be 24 ft. wide with sheet asphalt top and concrete base. It is part of Route 2 as designated in the schedule of the state highway system, from San Francisco along the coast to San Diego. The total cost of this work is \$89,368.

The second section for which bids were received, runs from the southern boundary of Mendocino County to Hopland, a distance of 13 miles. The road is to be graded, 13 ft. wide, and is part of Route 1 of the highway system from San Francisco north to the Oregon line. The total amount of the successful bid on this contract was \$67,425.

Another section runs from the northern boundary of Madera in Madera County to Califa, a distance of 10 miles. The road is to be 15 ft. wide and to be constructed of oil macadam. This is part of route 4 of the state highway system, which runs from Sacramento to Los Angeles, through the central part of the state. The total amount of the successful bid was \$72,091.

The fourth stretch is from Marysville to Morrison's crossing in Yuba County, a distance of 9 miles. It will be constructed of oil macadam, and will cost \$66,780. It is part of route 3 of the state highway system from Sacramento north to the Oregon line, on the east side of the Sacramento River.

In addition to this work, surveys have been ordered for an important link in the main valley route between Sacramento and Los Angeles, embracing 123 miles of road along route 4, from Fresno to Bakersfield, including a bisecting lateral connecting Vasalia and Hanford.

Favor a New Road at Sea Cliff, L. I.

Agitation of 20 years standing looking toward the construction of a road skirting Long Island Sound at Sea Cliff, L. I., and which will materially shorten the route between New York City and Oyster Bay, is being brought to a climax through the efforts of residents of Sea Cliff. A mass meeting will be held at the schoolhouse at that place on July 16, in the interests of the project.

The present road is now so located at that point that it not only adds materially to the distance between New York City and intermediate points and Oyster Bay, but also crosses a steep and dangerous hill, and has long been a subject for complaint from automobilists and others obliged to use it. A road along the shore of the Sound would seem to be the logical route, as it would be practically level, and pass through some of the most attractive scenery along the Sound. The road over the hill was built 20 years ago at the instigation of the residents of Sea Cliff, who feared that a shore road would cause a deflection of business from the village of Sea Cliff, which at that time lay inland.

The proposed route will extend from the Sea Cliff steam boat dock at Pirie's Point, a distance of about one-half mile. On account of a sea wall, which it will be necessary to build, the cost will be considerable, a rough estimate setting it at about \$100,000.

It is the hope of those favoring the project that the meeting will result in arousing enough interest on the part of the residents of Sea Cliff and others so that the county commissioners of Nassau County will be induced to build the road.

The town of Milwaukee, Ore., has recently spent \$65,000 in improving its streets, and it is said that further projects are pending.

The Board of Aldermen of Providence, R. I., has authorized a loan of \$60,000 for widening and repaving Plainfield St. from Olneyville Sq. to Pocasset Ave.

The county commissioners assisted by the convicts from the Kansas penitentiary and farmers are to build a rock road from Kansas City to Lansing, Kan., a distance of 30 miles. The farmers are to cooperate by permitting the quarrying of the necessary stone from their farms. Work has already begun.

Infringement of Bridge Patents

The validity of 24 patents issued between May 15, 1900, and November 12, 1911, on cost-saving improvements in concrete bridges, granted to Daniel B. Luten, is the subject of a warning to infringers, recently issued and distributed among the trade by the National Bridge Co.

Several cases of infringement, which were prosecuted by Mr. Luten, and which were decided in his favor are cited, and two decrees which were handed down by the District Court of the United States, one for the Western District of Pennsylvania and the other for the District of Massachusetts are appended.

In the Pennsylvania case, in which Mr. Luten was complainant, Emil E. Knobloch and William H. Shelton, doing business under the style of Knobloch & Shelton were the respondents. The decree was handed down that Emil E. Knobloch was guilty of threatened or contributory infringement of the claims of several of the patents, by reason of entering into a contract for the erection of a bridge, the plans of which include the inventions of Mr. Luten, but inasmuch as the plans were changed before the erection of the bridge and no actual infringement or profit had been made, nominal damages for the cost of the suit were awarded Mr. Luten, and a perpetual injunction was made, enjoining the defendant, from directly or indirectly having any part in the construction of an arched structure embodying any of the inventions or improvements covered by the patents. This decree was handed down April 6, 1912.

On May 13, 1912, the District Court of the United States for Massachusetts, presented in the case of Mr. Luten against George Van Vranken and Joseph N. Tanner, inasmuch as more than 30 days had passed since the entry of the order, a decree pro confesso, the defendant having failed to answer said order stating that the complainant was sole and exclusive owner of the patents involved and enjoining the defendants from infringing on the same and from preparing plans, contracting and erecting or assisting in the erection of bridges embodying any of the inventions or improvements of the patents during their term of life.

Shelby County, Tenn., to Overdraw Fund Account

The County Court of Shelby County, Tenn., of which Memphis is the county seat, has passed resolutions providing for the payment of interest on approximately \$200,000 of turnpike and bridge warrants from now until March 1, 1913.

Justice F. M. Guthrie, who introduced the resolution providing for the payment of this interest, made a summarized statement embracing the following figures: Bridge warrants, outstanding January 1, 1912, \$32,835; issued since Jan. 1, \$49,771; warrants paid past six months, \$30,568; warrants now outstanding, \$52,039. It is shown by this statement that in the matter of turnpike warrants, the total amount outstanding to Jan. 1 was \$170,212.74. Warrants now outstanding amount to \$56,540.47, to which must be added \$23,500, which is due the city of Memphis from the turnpike fund under one of the old annexation acts, thus making an indebtedness total of \$79,040.47 against this year's taxes, which will not be collected before next March.

Mr. Guthrie stated that the commissioners estimated that the smallest sum necessary to make the most urgent repairs on the traveled roads in their departments will be \$100,000.

The rate of interest was set at 6 per cent. to be paid on not to exceed \$100,000 in each department, this to include the warrants now outstanding and interest to date on new warrants from July 1, or from the date on which warrants hereafter issued may be registered with the county trustee.

In addition to the \$100,000 of new turnpike warrants, interest will be paid on the \$56,400 now outstanding.

An Opinion on the Ohio Road Law

Attorney General Bell of Ohio has given an opinion relating to the road tax, which interests county supervisors throughout the state. The opinion was given in answer to a request from Auditor General Sisson, as to whether townships of the second class, which during the year 1911, collected their road taxes in cash, are entitled to receive any part of the appropriation of \$500,000 provided for by the highway act of June 14, 1911.

After quoting the law and making a careful analysis of its meaning according to his interpretation of it, the Attorney General decided in favor of the townships in the following terms:

"You are, therefore, advised that in the opinion of this department, one-half of the appropriation carried by the act of paying the bonus authorized by said act, should be applied pro rata to the payment of 50 per cent. of the amount of road taxes collected in cash during the year 1911 by such townships of the second class as have collected their road taxes in cash and have filed the required reports with the state highway commissioner on or before the first day of January, 1912."

Ohio State Road Contracts Cancelled

Contracts for the building of Ohio state roads by convict labor have been cancelled, upon the suggestion of State Highway Commissioner J. R. Marker to the State Board of Administration, whose refusal to permit the use of convicts on the highways unless the counties would sustain them during the work, delayed the work on four sections of state highways.

The board agreed to annul the contracts, and thus permit the highway authorities to make other arrangements for the work, so that the roads might be completed promptly. The action of the board was the result of an opinion handed down by Attorney-General Hogan.

New Superintendent of Highways in Brooklyn

Maj. John W. Tumbridge has been appointed Superintendent of Highways in the Borough of Brooklyn, New York City, to fill the vacancy caused by the death of Frederick Linde. Maj. Tumbridge has been active in civic affairs, taking a prominent part in the Brooklyn city planning movement, and has been a worker in the Brooklyn League and other civic associations. He is a civil engineer and served as City Engineer of Waterbury, Conn., some years ago.

The Board of Supervisors of Adams County, Tenn., has authorized a bond issue of \$150,000, the proceeds to be used for improvement of highways. The bonds will bear interest at 5 per cent. and will run 40 years.

It is said the road surfaces through the canons of Salt Lake County, Utah, are being badly torn up by droves of sheep which pass through there, and it is being urged that the plan in vogue in Weber County, of levying a tax on every herd of sheep that passes through a canon and using it for the repairing and clearing of the roads after they pass through, be adopted in Salt Lake County.

A committee representing the promoters of the South Dakota Scenic Highway is making a tour through the state over the route of the proposed road, stopping at all the towns along the route and holding public meetings. It is proposed to present a bill at the next session of the Legislature providing for the use of the convicts in the state penitentiary on the state roads and asking for an appropriation of \$1,000,000 to be expended for the purpose of constructing state roads.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. J. E. Pennybacker, Secretary, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

General News

At a recent meeting of the City Commissioners of Dallas, Tex., J. M. Preston was reappointed City Engineer.

An election will be held in Brunswick, Ga., to vote on the question of issuing road bonds to the amount of \$100,000.

A bridge, which is estimated to cost over \$1,000,000, will be constructed over the River Main in the city of Frankfurt, Germany.

The Spokane County Good Roads Association, 408 Fernwell Block, Spokane, Wash., has issued a booklet entitled "Earth Roads."

On July 23 an election will be held in Dublin, Tex., to vote on the question of issuing bonds in the sum of \$200,000. The proceeds will be used for road improvement.

The question of issuing bonds in the sum of \$1,250,000, the proceeds to be used for highway improvement, will be submitted to a vote of the people of Redwood City, Cal.

On August 5 an election will be held in St. Louis, Mo., to vote on the question of issuing bonds to the amount of \$2,750,000, the proceeds to be used in constructing three bridges.

An election will be held in St. Joseph, Mo., on August 10 to vote on the proposition of issuing bonds to the amount of \$1,000,000, the proceeds to be used in road improvement.

The Maine Automobile Association, 12 Monument Square, Portland, Me., has issued its Automobile Road Book of Maine for 1912. The book is 4 ins. by 8 ins. in size, and contains many routes and maps.

At a meeting of the Amity Good Roads Association, held in Amity, Pa., recently, the following officers were elected: President, Dr. W. L. Dodd;

First Vice President, W. C. Baldwin; Second Vice President, Howard Adamson; Secretary, H. Condit; Treasurer, Charles E. Hackney.

The Massachusetts State Highway Commission is contemplating the improvement of the road between Lenox and Pittsfield in Berkshire County. The highway will be recrowned and widened its entire length and the work will cost approximately \$30,000.

It is stated in the Daily Consular and Trade Report for May 14 that it is proposed to widen the Avenida Atlantica, which runs from Leme to Igrejinha, Brazil, and lay a new surface of asphalt over a greater part of it. Pavements for pedestrians will be built on either side.

The Roland Park Co., Roland Park, Md., is interested in the development of Guilford Park, Baltimore. The work, which is estimated to cost \$800,000, involves the construction of roads, sidewalks, storm water drains and sewers, and will also require 300,000 cu. yds. of earth excavation.

Personal Notes

M. K. Allen has been appointed City Engineer of Regina, Sask., succeeding L. A. Thornton, who was appointed City Commissioner.

E. B. Ulrich, who for some time has been serving in the capacity of City Engineer of Reading, Pa., has been reappointed to that office.

Sir Maurice Fitzmaurice has resigned as Chief Engineer to the County Council of London, England. Sir Maurice will engage in private practice.

Professor Arthur H. Blanchard of Columbia University, New York City, has recently been elected a member of the Canadian Society of Civil Engineers.

Adam P. Linton, of Regina, Sask., has been appointed Assistant Chief Engineer for the Province of Saskatchewan, Canada.

M. R. Osborne has been appointed Road Supervisor of the Murphy Dist. in Ritchie County, W. Va. He succeeds M. P. Cunningham, who recently resigned.

H. G. Phillips, of Regina, Sask., has resigned his position as Provincial Surveyor and Engineer of Saskatchewan. Mr. Phillips will engage in private practice.

Herman L. Arbenz of Wheeling, W. Va., has been appointed Senior Highway Engineer in the Office of Public

Roads, Department of Agriculture, Washington, D. C. Mr. Arbenz, who is a civil engineer and landscape architect, is a graduate of Lehigh University.

W. S. Knight has been elected Bridge Superintendent of Shelby County, Tenn., by the County Court. He succeeds F. C. Owen, whose term of office has expired.

Hon. Frank Cochrane has been selected to represent the Dominion government of Canada at the Third International Road Congress, which will be held in London, England, in June, 1913.

G. S. Lindsay, formerly in the Road Oil Dept. of the Indiana Refining Co., has severed his connection with that company and has become associated with the Robison Process Co., 39 Cortlandt St. New York City.

Charles W. Helmick, formerly City Engineer of Helena, Mont., has resumed his practice as civil and consulting engineer, with offices in the Pittsburgh Block, Helena. Mr. Helmick will be succeeded by William Jordan.

Frank W. Seth, of Baltimore, Md., has been appointed by the Board of Commissioners as Road Engineer for Talbot County, Md. Mr. Seth was formerly with the U. S. Coast and Geodetic Survey at Washington.

W. J. Zartmann, formerly Superintendent of Parks of the Borough of Brooklyn, New York City, has been appointed Principal Assistant Engineer of the Department of Parks of the Borough of Queens, New York City.

C. D. Campbell has been appointed Town Engineer of Galt, Ont., succeeding E. O. Fuce, Assoc. M. Can. Soc., C. E., who recently resigned to engage in private practice with an office in Calgary, Alta.

J. C. Pinney, Jr., has been appointed Superintendent of Bridges and Buildings of Milwaukee, Wis., at a salary of \$2,200 per annum. Mr. Pinney was formerly instructor in bridge engineering at the Marquette University in Milwaukee.

Trade Notes

The Taylor Iron & Steel Co., High Bridge, N. J., has issued an attractive folder describing its Tisco steel products.

The Westchester & Fairfield Amiesite Co., 103 Park Ave., New York City, has issued a catalogue which contains illustrations of its Amiesite pavement laid in various towns throughout the country. The catalogue is 7½ x 8 ins. in size and contains 24 pages.

CONTRACT NEWS

ROADS AND STREETS

Contracts Pending

Date of letting	Reported in issue of
7-13 Little Rock, Ark., paving.....	7-13
7-13 Monticello, Ill., rd. constr.....	7-6
7-15 Columbus, O., paving.....	7-13
7-15 Orange, Cal., st. sweeper.....	7-13
7-15 Waverley, Ia., paving.....	7-13
7-15 Roselle Park, N. J., paving.....	7-13
7-15 East Youngstown, O., paving.....	7-13
7-15 Westfield, N. J., rd. impt.....	7-6
7-15 Idaho Falls, Id., rd. constr.....	7-6
7-15 Waverly, Ia., paving.....	7-6
7-16 Pittsburgh, Pa., rd. impt.....	7-6
7-16 Marietta, O., paving, grad., etc.....	7-13
7-16 Cario, Ill., gravel.....	7-13
7-16 Kingston, Ont., paving.....	7-13
7-16 New York, N. Y., paving.....	7-13
7-16 New York, N. Y., st. impt.....	7-13
7-17 Caldwell, O., paving, etc.....	7-13
7-17 Canton, O., paving.....	7-13
7-17 New York, N. Y., paving.....	7-13
7-18 Norfolk, Va., paving.....	7-13
7-18 Upper Sandusky, O., paving.....	7-13
7-18 Youngstown, O., grad., pav., etc.....	7-13
7-18 Hartford, Conn., macadam rd.....	7-13
7-18 Norfolk, Va., paving, etc.....	7-6
7-19 Wetumpka, Ala., paving, etc.....	7-6
7-19 Dayton, O., paving bonds.....	7-6
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ROADS AND STREETS

Bids Asked and Prospective Work

Elba, Ala.—Bids will be received by the Commissioners of Coffee Co., until July 19, for the grading, draining and surfacing, with sand clay, of five miles of the Enterprise and Damascus Rds.

Little Rock, Ark.—The Commissioners of the East Third St. Dist., have decided to advertise for bids until July 13, for street improvement, including the following streets: E. 3rd St., from Main St. to Rector Ave. and Rector Ave. and Ferry St., from 3rd St. to Capitol Ave. Cressed wooden blocks, asphalt, brick, Tarvia and macadam are named in the specifications.

Pine Bluff, Ark.—Plans and estimates are being prepared for the paving of a number of streets. Address the Pres. of Bd. Loc. Imps.

Anaheim, Cal.—The Anaheim Bd. of Trade is taking steps to secure the construction of a paved boulevard from the south limit of Anaheim to the north limit of Fullerton.

Bakersfield, Cal.—City Eng. has been instructed to prepare plans and specifications for the paving of F St., between 15th and California Sts.

Long Beach, Cal.—Plans are being completed for the construction of a wide cement walk on the east side from Alamitos Ave. to 20th St.

San Diego, Cal.—The City Eng. has prepared plans for the construction of an asphalt pavement on 4th St. from A St. to University Ave. Bids for the work will be received about the last of the month.

Hartford, Conn.—Bids for the construction of about 6,415 lin. ft. of macadam road under the formula of the State Highway Dept., will be received at the office of James H. MacDonald, State Highway Cmr., Room 27, State Capitol, until July 18. Plans or specifications may be examined at the Selectmen's office, Nor-

walk, Conn. A common or surety company bond, or a certified check in the sum of 1/4 of the amount of the bid must accompany each proposal.

Middletown, Conn.—About \$9,000 will be expended in street improvements.

Wilmington, Del.—It is stated that \$36,000 has been appropriated for the construction of good roads. Address the City Clerk.

Savannah, Ga.—Ordinances were passed by Council recently providing for the paving of Varnard St. from the south property line of State St. to the north property line of Gaston. Four separate ordinances were passed for these improvements.

Bloomington, Ill.—Emerson and Clinton Sts. will be paved with brick, about 14,235 sq. yds. Elmer Folsom is City Engr.

Collinsville, Ill.—A number of streets throughout the city are to be paved at once. Address the Pres. of the Bd. of Loc. Imps.

East St. Louis, Ill.—The City Council has passed an ordinance providing for the paving of State St., with vitrified brick. Address John J. Faulkner, Pres. of the Bd. of Loc. Imps.

Evanston, Ill.—About \$25,000 will be expended paving W. Railroad Ave. Address the City Clk.

Jerseyville, Ill.—Plans have been prepared for the paving of Arch, Jefferson and Olive Sts. Approximately 6,500 sq. yds. of paving will be required. Estimated cost, \$13,000.

Pontiac, Ill.—The City Council has passed an ordinance for brick paving on concrete base. Estimated cost, \$60,000.

Rock Island, Ill.—The matter of paving several streets throughout the city is under consideration. Property holders have presented petitions. Address the Mayor.

Urbana, Ill.—The City Council is planning to expend \$11,000 constructing cement sidewalks. Address the City Clk.

Angola, Ind.—The W. J. Sherman Co., The Nasby, Toledo, O., is preparing plans for street improvements in Angola.

Delphi, Ind.—Bids will be received at Delphi, until July 25, for constructing joint gravel road on line between Carroll and Tippecanoe Cos. M. G. Haun, Aud., Carroll Co.

Clinton, Ia.—Bids will be received by the City Council until July 23, for the grading, paving and curbing of 3rd St. R. C. Hart is City Engr.

Fairfield, Ia.—The City Council will pave many streets this summer. Address the City Clk.

Waverly, Ia.—Bids will be received until July 15, by the City Council for the construction of 33,600 sq. yds. of paving and 15,600 lin. ft. of curbing.

Hiawatha, Kan.—The property holders are circulating petitions asking that a number of streets be paved.

Hickman, Ky.—The City Council intends graveling all the city streets and paving the main ones. The estimated cost is about \$14,000. Address the City Clk.

Pikeville, Ky.—Bids will be received until July 25, for constructing \$15,000 sq. yds. of brick paving.

Augusta, Me.—Bids will be received until 3 P. M., July 29, for building a section of State road, 4.54 miles in length on the designated trunk line in the towns of York and Wells. P. L. Hardison is State Cmr. of Highways, Augusta.

Warrensburg, Mo.—Resolutions have been passed by the City Council, providing for the improvement of Maguire, Mulberry, Grover, Mung, and S. Holden Sts.

Roselle Park, N. J.—Bids will be received by the Borough Council, until July 15, for the improvement of Chestnut St., from Westfield Ave. to Sumner Ave., by paving with concrete and constructing curbs and gutters. J. Wallace Higgins, 347 Fifth Ave., New York, N. Y., is Engr.

Dunkirk, N. Y.—The City Council is planning to pave upper Deer St. Address the City Engr.

Mechanicville, N. Y.—Bids will be received until July 24 for laying 17,000 sq. yds. of bituminous pavement, 6,000 ft. old curb and 1,000 ft. new curb, etc.

New York, N. Y.—Bids will be received by George Cromwell, Pres. Boro. of Richmond, Boro. Hall, St. George, New Brighton, until noon, July 16, for furnishing all the labor and materials required

for regulating and repaving with wood block pavement on present concrete foundation the roadways of Richmond Ave., from Richmond Terrace to south property line of Post Ave. and other streets.

Bids will be received at the office of Alfred E. Steers, Pres. Boro. of Brooklyn, Room 2, Borough Hall, until July 17, for regulating, grading, curbing and laying sidewalks on Benson Ave., from 22nd Ave. to 25th Ave.; on Church Ave., from Ocean Parkway to Gravesend Ave., on E. 12th St., from Kings Highway to Ave. O; on Hendrix St., from New Lots Ave. to Vienna Ave.; on Hopkinson Ave., from Dumont Ave. to Livonia Ave.; on Livonia Ave., from Powell St. to Junius St.; for regulating and grading Malbone St.; from New York Ave. to Brooklyn Ave.; for regulating, grading, curbing and laying sidewalks on Saratoga Ave., from Pitkin Ave. to Blake Ave.; on 61st St., from 12th Ave. to Hamilton Ave.; on 66th St., from 13th Ave. to New Utrecht Ave.; on Coney Island Ave., from Kings Highway to Neptune Ave.

Bids will be received by Cyrus C. Millen, Pres. Boro. of The Bronx, Municipal Bldg., Crotona Park, 177th St. and 3rd Ave., until 10.30 A. M., July 16, for repaving with sheet asphalt on a concrete foundation the roadway of Adams Place, from E. 182nd St. to Crescent Ave., and setting curb where necessary; the roadway of Oak Tree Place, from Lafontaine Ave. to Hughes Ave., and setting curb where necessary; for repaving with redressed granite blocks on a concrete foundation the roadway of Webster Ave., from E. 171st St. to the south side of Wenderover Ave., and setting curb where necessary; for regulating, grading, setting curbstones, flagging, building approaches and erecting fences where necessary in Leland Ave., from Walker Ave. to Westchester Ave.; for completing the contract for regulating grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in W. 230th St., from Bailey Ave. to Riverdale Ave.; for repaving with granite blocks on a concrete foundation the intersection of 161st St. with Park Ave. east and with Park Ave. west, and setting curb where necessary; for regulating, grading, setting, curbstones, flagging sidewalks, building approaches and erecting fences where necessary in W. 235th St., from Spuyten Duyvil Parkway to Riverdale Ave.; for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Zerega Ave., from Ludlow Ave. to Westchester Ave.

Poughkeepsie, N. Y.—The following streets will probably be improved; Washington St. to Parker Ave., to be paved with vitrified brick; Garden St. to N. Hamilton St., to be repaired with sheet asphalt.

Troy, N. Y.—Specifications have been adopted for paving streets with macadam and Tarvia or a bituminous binder. Bids will be received until July 24 for the paving of S. 2nd Ave. and 3rd Ave., as far north as Chestnut St.

Canton, O.—Bids will be received until July 17, for laying one mile of brick block pavement, on a concrete base, and one mile of grading, curbing and sidewalk. Estimated cost, \$51,500. P. H. Weber is City Engr.

The City Council has passed an ordinance providing for the paving of E. Lake St., from Market to St. Elmo Sts.

Caldwell, O.—Bids will be received at the office of the Cmr. of Noble Co., at Caldwell, until noon, July 17, for grading and paving with brick for medium traffic the Caldwell-Carlisle Rd. in Olive Twp., Noble Co. The proposed improvement will be 5,302 ft. long, 14 ft. wide and is estimated to cost \$17,614. Plans and specifications are on file in the office of the Co. Cmr. and the State Highway Dept., Columbus.

Columbus, O.—Bids will be received by John Hintschied, Vil. Clk., Grandview Heights, until July 15, for grading and paving with water bound macadam, with bituminous surface treatment, Dale, Elmwood and Bluff Aves.

East Youngstown, O.—Bids will be received until July 15, by the Vil. Council, at E. Youngstown, for grading and sewerage Wilson Ave., Robinson Tr., Jefferson, Washington, 12th, 11th and Short Sts.

Elyria, O.—Bids will be received at the office of the Cmr. of Lorain Co., at Elyria, until 10 A. M., July 19, for grad-

ing and paving with a waterbound macadam, the Brownhelm-Amherst Rd. in Brownhelm and Amherst Twp., Lorain Co. The proposed improvement will be 4,750 ft. long, 12 ft. wide and is estimated to cost \$6,128. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Marietta, O.—Bids will be received at the office of the Cmrs. of Washington Co., at Marietta, until 1 P. M., July 16, for grading and paving with a bituminated concrete, the new Matamoras Rd., in Grandview Twp., in Washington Co. The improvement will be 5,280 ft. long, 16 ft. wide, and is estimated to cost \$12,299. Plans are on file in the office of the Co. Cmrs. and the State Highway Dept., Columbus.

St. Clairsville, O.—Bids will be received by the Rd. Cmrs. of Mt. Hope, at St. Clairsville, until July 20, for constructing a free turnpike.

Youngstown, O.—Bids will be received at the office of the Cmrs. of Mahoning Co. at Youngstown, until 10 A. M., July 18, for grading and paving with a waterbound macadam, the Youngstown-New Bedford Rd. in Colville Twp., Mahoning Co. The proposed improvement will be 6,600 ft. long, 14 ft. wide, and is estimated to cost \$16,645. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept., Columbus.

Harrisburg, Pa.—Bids will be received by E. M. Bigelow, State Highway Cmr. in the Capitol Bldg., Harrisburg, until July 30, for the construction of 7,400 lin. ft. telford-macadam and 17,440 lin. ft. brick block and 67,746 lin. ft. bituminous macadam. (See official advertisement in this issue.)

Reading, Pa.—The Mayor has signed a resolution, authorizing street improvement in Reading.

Norfolk, Va.—Bids will be received by the Bd. of Control, until July 18, for regulating and paving 10th St., Colley Ave., 13th, 14th and 15th Sts.

Colfax, Wash.—At the meeting of the Town Council, it was decided by unanimous vote to pave a large portion of the north part of Colfax with Bitulithic the advertising of for bids on the work. The district includes the north part of Main St., the cross streets between Main and Morton Sts., and Morton St. from the depot to the ball grounds.

The plans and specifications for the paving of the Perkins Ave. Dist., were adopted and steps were taken for active work.

Pullman, Wash.—Ordinances have been passed authorizing the paving of a number of streets in Dist. No. 10 and 11, and the advertising of bids on the work. Bids will be received on all hard surface paving, including Bitulithic, Hassam, Dolarway and asphalt. The following are the streets to be improved: State St., from Garden City addition to Olson St.; Olson St. to Grand; Palouse from the Northern Pacific depot to Star Route Ave.; Star Route Ave. to Montgomery St. and Montgomery St. to the college campus, near the conservatory of music.

Spokane, Wash.—The City Council is planning to pave Boone Ave. from Division to Superior St. Address D. C. Coates, Cmr. of Pub. Wks.

Wallia Wallia, Wash.—The City Cmrs. will receive bids until Aug. 1, for paving E. Adler and N. Rose-Sumach Sts. with a hard surface pavement, about 12,000 sq. yds. of 34-ft. pavement, 3,500 sq. yds. of 28-ft. pavement, grading, curbing and draining, etc.

Huntington, W. Va.—Bids will be received by the City Cmrs., until July 22, for the labor and materials necessary to grade, curb and pave with vitrified brick 4th and 5th Sts., 8th Ave., and several alleys. A. B. Maupin is City Engr.

Kingston, Ont.—Bids will be received by R. J. McClelland, City Engr., until 3 P. M., July 16, for the construction of 7,200 sq. yds. of asphalt block or vitrified brick pavements, and 3,000 lin. ft. concrete curb. Plans and specifications may be seen and all other information obtained at the office of the City Engr.

North Toronto, Ont.—Bids will be received until noon, July 30, by William C. Norman, Clk. North Toronto, for the following work: Tarvia macadam, with concrete curb on Yonge St. Driveway; Glenview Ave.; Chancellor St.; Glengrove Ave. and Sherwood Ave.; sheet asphalt, brick, Bitulithic, Dolarway, asphalt block or any other permanent pavement on Merton St., Eglington Ave. East, Broadway Ave., Blythwood Rd., Bowood Ave. and Glencairn Ave., Roselawn Ave. and St. Edmunds Drive. Plans and specifications and form of tender may be seen at the Town Hall, North Toronto or Room 6, 57 Adelaide St. East, Toronto.

Bids Received and Contracts Awarded

Carrollton, Ala.—A contract for building four miles of State aid model highway was awarded to A. T. Newell of Birmingham, at \$7,351.60. Two bids were received for this work.

Little Rock, Ark.—The contract for paving W. 10th St., from Center to High Sts., was awarded by Cmrs. of the 10th St. Improvement Dist. to Shelly & Bateman, at \$1.18 per sq. yd., for Dolarway. The total cost of the improvement is estimated at about \$41,000.

Los Angeles, Cal.—Edgar T. Wheeler, 1,038 W. 20th St., Los Angeles, has been awarded the contract by the Bd. of Supervisors for protection work over the San Gabriel River in the San Antonio Protection Dist., at \$20,000.28 for driving 2,028 piles; \$8,376 for constructing a trestle bridge, and \$1,540 for excavating and level work.

Ventura, Cal.—The Portland Concrete Pile Co., Phelan Bldg., San Francisco and Portland, Ore., was awarded the contract at \$49,625 for the construction of the reinforced concrete bridge over the Ventura River on W. Main St. The proposed bridge will be designed after the Thomas 3-hinged arch system. The plans calling for a structure 950 ft. long, consisting of six 120-ft. central spans and two 115-ft. end spans.

Wilmington, Cal.—The contract was awarded to O. L. Stetvens, at \$8,119 for grading and graveling, cement curbs, gutters and sidewalks on Lorens St. W. E. Nicols was awarded the contract at \$6,622 for grading and graveling, cement curbs, gutters and sidewalks and granite block gutters on Broadway.

Crete, Ill.—A contract has been awarded to Joseph Orr at \$10,000 for constructing three miles of stone roads.

Decatur, Ill.—The contract for a concrete road is reported awarded by Highway Cmrs. to the Driscoll-McCalman Co., of Decatur, at \$9,654.

Lewistown, Ill.—A contract has been awarded to Everett Prosser of Cairo, Ill., at \$35,458, for paving with brick.

Paxton, Ill.—The contract for improving W. Patton and E. State Sts., has been awarded to E. J. Westbrook of Paxton, for \$12,893.

Rock Island, Ill.—The Bd. of Loc. Imps. proposes to pave 20th St., between 1st and 4th Aves., with brick, and between 2nd and 4th Aves. with asphalt.

Virginia, Ill.—A contract has been awarded to the Illinois Concrete Constr. Co. of Springfield, at \$21,583, for paving in Dist. No. 2.

Indianapolis, Ind.—The Bd. of Pub. Wks. is stated to have awarded a contract for paving with bituminous concrete a portion of E. New York St. to the Union Asphalt Constr. Co. at \$2.20 per lin. ft. The total cost is about \$24,000.

Albia, Ia.—A contract has been awarded to the M. Ford Paving Co., Cedar Rapids, Ia., for the construction of 10,800 sq. yds. of brick block pavement and 8,700 yds. of curb and gutter, at \$1.96 per sq. yd. and 55c. per lin. ft., respectively.

Westfield, Mass.—A contract has been awarded to Bernice, Adams and Ruxton Constr. Co. of Springfield, for about 7,000 sq. yds. of pavement.

Grand Rapids, Mich.—A contract has been awarded to D. W. Bayes at \$6,438 for grading and graveling N. Colt Ave.

Duluth, Minn.—Three paving contracts aggregating \$60,000 have been awarded by the Bd. of Pub. Wks. as follows: 21st Ave., west from the dock to 3rd St., with sandstone blocks, to J. W. Preston, \$27,667; Ramsey St., from Grand Ave. to Central, to E. A. Dahl, \$9,703.35; Central Ave., from Rosevelto St. to Cody, to E. A. Dahl, \$22,449.

Elizabeth, N. J.—A contract has been awarded by the City Council to James J. Potter, Elizabeth, at \$12,276, for the construction of a brick pavement on Atlantic Ave. William H. Luster is City Engr.

Auburn, N. Y.—Contracts were awarded by the Common Council as follows: Lincoln St., to Tumpuskil & Stents, of Binghamton, \$10,287; Green St. and Five Points, to Fine & Willey, for \$3,007 and \$4,765, respectively.

Herkimer, N. Y.—A contract has been awarded to Warren Bros. Co., at \$15,027, for paving Albany St.

North Pelham, N. Y.—The contract has been awarded to Smith Bros., of Pelham, at \$6,035, for concrete curbing and resetting bluestone curb on 5th Ave. and on 4th St.

Fargo, N. D.—A contract has been awarded to James Kennedy at \$1.65 per

sq. yd., for paving with concrete certain alleys in the 1st and 5th Wards.

Ponca, Okla.—A contract has been awarded Young Bros. Constr. Co., St. Joseph, Mo., at \$27,181, for paving 1st and Grand Aves.

Poteau, Okla.—A contract has been awarded to Burk Bros., Fort Smith, Ark., at \$40,998, for grading, draining, macadamizing, curbing and guttering the following streets: Bagwell St., from Sage Ave. to Amos Ave.; Walter St., from Dewey Ave. to Amos Ave.; Harper St., from Rogers Ave. to Ward Ave.; Witte St., from Dewey Ave. to Elm Ave.; McKenna St., from Dewey Ave. to Parker Ave.; Dewey Ave., from Frisco right of way to the Kansas City Southern right of way; Clayton Ave., from McKenna St. to Bagwell St.; Parker Ave., from Frisco right of way to Walter St.; Sage Ave., from Walter St. to Bagwell St.; Ward Ave., from Witte St. to Bagwell St.

Harrisburg, Pa.—Bids were received as follows by the State Highway Dept. for road improvement:

Route 155—Bucks Co., 45,460 ft. asphaltic macadam: Wm. C. Evans, Ambler, \$195,115; The Monroe Paving Co., Langhorne, \$195,907; G. Hinkle, Inc., Altoona (two bids), \$240,831 or \$202,039; Union Paving Co., Philadelphia, \$169,787 (awarded contract).

Route 142—Lancaster Co., Salisbury Twp., 10,334 ft. asphaltic macadam: Geo. C. Souder, Lancaster, \$31,354 (awarded contract); Fogel & Co., Hollidaysburg, \$40,299; M. Bennett & Sons, Indiana, \$32,567; The Juniata Co., Philadelphia, \$42,456; Thos. E. McManus, Lancaster, \$39,927.

Fayette Co., Wharton Twp., 1,337 ft. concrete: Chas. T. Eastburn Co., Philadelphia, \$5,706; Wyoming Valley Constr. Co., West Nanticoke, \$5,196 (awarded contract).

Pittsburgh, Pa.—A contract has been awarded to James Topley & Son, of McKeesport, at \$9,559, for improving 924 ft. of the Versailles Rd., near the Olympia Park entrance. The road will be paved with brick.

Contracts for street work have been awarded by the Dept. of Pub. Wks. as follows: Repaving Merriam St. with block stone, to Booth & Flinn, at \$2,963; repaving Ellsworth Ave. with asphalt, to the Barber Asphalt Paving Co., at \$23,698; repaving Fox alley with brick, to J. B. Sheets Co., at \$1,795; reggrading and repaving Tabor St. with blockstone, Booth & Flinn, at \$2,172; grading, paving and curbing St. Patrick St., to Ott Bros. Co., at \$4,128; repaving 23rd St. with block stone, to Booth & Flinn, at \$3,468.

Sioux Falls, S. D.—A contract has been awarded to the Sioux Falls Constr. Co., of Sioux Falls, at \$1.03, \$1.08 and \$1.36 per sq. yd., for paving with Portland cement concrete on portions of Phillips Ave. and 9th St., in all about 6,329 yds.

Benton, Tenn.—A contract has been awarded to McClary Bros. & Russel, Benton, at \$12,000, for the construction of a pike road from Bradley Co. line to Benton, via Benton Station, and from Duckton Station to Copperhill via Isabella. The contract calls for grading and macadamizing about 4½ miles.

Palestine, Tex.—A contract has been awarded to Larkland & Carroll, of Palestine, at \$40,000 for constructing 20 miles of sand clay road.

Paris, Tex.—A contract has been awarded to the O'Neill Engg. Co., of Dallas, by the Cmrs. of Lamar Co., for the construction of 40 miles of roads in Precinct No. 1. Bonds to the amount of \$300,000 were voted several months ago.

Sealy, Tex.—A contract has been awarded to the Texas Grading Co. for the construction of good roads. Bonds to the amount of \$100,000 were recently voted for this purpose.

Salt Lake City, Utah.—A contract has been awarded to P. J. Moran, Salt Lake City, at \$23,521, for the construction of two blocks of paving and three intersections at \$23,521. The work also includes repairs to old pavement at \$1.72 per sq. yd.

Ellensburg, Wash.—A contract has been awarded to the Hardy Constr. Co., of North Yakima, at \$20,000, for the construction of 16,750 sq. yds. of Dolarway pavement.

Puyallup, Wash.—A contract has been awarded to the Washington Paving Co., of Tacoma, at \$15,643, for paving Railroad Ave.

Reardon, Wash.—A contract has been awarded to John P. Costello & Co., Spokane, at \$16,500, for building 3½ miles of State highway.

Milwaukee, Wis.—The D. M. Snedden Co. was the only bidder on the New Chicago Rd. contract, and received the contract at 42c. a sq. yd. for the concrete work and 80c. a yd. for the grading. The concrete is to extend for nine ft. on each side of the electric railway track. The McGucken Co. was awarded the contract for the Kilbourn Rd. at 38c. a sq. yd. for concrete and grading 80c. and also for the North Fond du Lac and Green Bay Rds. George Markey was awarded the contract for the Janesville Rd. at 50c. for concrete work, and for the Loomis Rd. at 38c. for concrete and 80c. for grading. Plans are also being prepared for the paving of the Watertown, Mukwonago and Kilbourn Rds. All the contracts awarded are for the building of concrete road beds.

South Milwaukee, Wis.—James Cape & Sons Co., have been awarded a contract for paving two of the main streets of South Milwaukee.

BRIDGES

Bids Asked and Prospective Work

Harrisburg, Ark.—Citizens of Lapanto have prevailed upon the County Judge to permit the construction of a bridge over the Little River. The probable cost is \$2,400.

Helena, Ark.—Bids will be received until 11 A. M., July 22, at the Court House in Helena, for the construction of two 40-ft. bridges and one 135-ft. bridge. The bridges will be located near Poplar Grove and Hugo in Phillips Co. John M. Quarles, Helena, is Rd. Cmr.

Fullerton, Cal.—The City Rd. Cmr. of Fullerton has commissioned C. A. Fisk, Engr. of Los Angeles to prepare plans and specifications for several concrete bridges, for which bids will be called for in a few weeks.

San Diego, Cal.—The City Engr. has been directed to prepare plans for two bridges, one at 22nd St., and the other at Beardsley St. The cost of the first, which will be of reinforced concrete, will be \$22,000. The R St. bridge at 32nd St., will be repaired, and other bridges and bulkheads rebuilt. The total cost will be \$50,000.

W. M. Rumsey, City Engr., has been directed by the City Council to prepare plans for a reinforced concrete bridge to be constructed across the San Diego River at Old Town. The work is estimated to cost \$16,000.

Ventura, Cal.—Bids will be received until July 15 by the Ventura Co. Bd. of Spvs., for the construction of eleven concrete piers to replace the pile piers under the twelve old spans of the Mantalvo bridge. The specifications provide for moving the old spans on to the concrete piers and anchoring same into place. The piers will each consist of two 4-ft. concrete cylinders sunk below ground water level, connected at top by a 12-in. reinforced concrete web. Bids will also be taken on an alternate plan in which a concrete pile foundation is substituted for the cylinders below scour.

Mulberry, Fla.—A bridge will be built across the Alafia River, also one across the Saddle Creek. The structures will be 425 ft. and 250 ft. long, respectively. Address the Bd. of Loc. Imps. of Polk Co.

Greenville, Ill.—Townships in Bond Co. have petitioned the Bd. of Spvs. for aid in building about fifty bridges at an estimated cost of \$15,200. Address the Pres. of the Bd. of Spvs.

Indianapolis, Ind.—The Bd. of Wks. has decided to ask the City Cont. to recommend an appropriation of \$10,500 for the construction of a bridge over Pleasant Run at Harlan St. C. A. Scharder is Pres. of the Bd.

Muncie, Ind.—Bids will be received by the Delaware Co. Cmrs., until 1:30 p. m., July 17, for constructing six bridges. F. M. Williams is Co. Aud.

Plymouth, Ind.—The Cmrs. of Marshall Co., at Plymouth, will receive bids until July 22, for the construction of six bridges. Geo. F. McCoy is Co. Aud.

Atchison, Kan.—Two bridges will be built in Atchison this year, one east of Muscotah, and the other over the Stranger Creek, near Potter. Address the State Engr.

Olathe, Kan.—Bids will be received until 12 noon, July 18, by the Montrose Co. Clk., in the Court House, at Olathe, for the construction of nine bridges, in Johnson Co., as follows:

Taggart Bridge: Steel I-beam top, wood floor, 30-ft. span, 19-ft. roadway and stone masonry abutments. Estimated

quantities: 53 cu. yds. stone in abutments. Excavation will be in clay and gravel foundations to be carried 3 ft. below bed of stream. Building stone for abutments can be obtained $\frac{1}{4}$ -mile from bridge site, sand and crushed rock must be shipped in. Nearest railroad station, Bonita, four miles.

Chase Bridge: Reinforced concrete top, 30-ft. span, 16-ft. roadway, and stone masonry abutments. Estimated quantities: 36.9 cu. yds. reinforced concrete and 6,067 lbs. steel in top and 73.6 cu. yds. of stone in abutments. Excavation will be in clay, foundations to be carried 3 ft. 6 in. below bed of stream. Building stone for the abutments can be obtained free $\frac{1}{4}$ mile from the bridge site. Sand and crushed rock must be shipped in. Nearest railroad station, Redel, $1\frac{1}{2}$ miles.

Burton Bridge: Riveted steel truss, 120-ft. span, 16-ft. roadway, wood floor and stone masonry abutments. Foundations to be carried into rock, 6 in. below stream bed. Building stone for abutments can be obtained $\frac{1}{4}$ -mile from bridge site, quarried for \$1.00 per cu. ft. Sand and rock must be shipped in. Nearest railroad station, Stanley, $3\frac{1}{2}$ miles.

Stephenson Bridge: Reinforced concrete top, 25-ft. span, 16-ft. roadway and stone masonry abutments. Estimated quantities: 24.9 cu. yds. reinforced concrete and 4,719 lbs. steel in top and 45.7 cu. yds. stone in abutments. Excavation will be in clay, foundations to be carried 2 ft. below bed of stream, 6 in. in rock. Building stone for abutments can be obtained one mile from bridge site, sand and crushed stone must be shipped in. Nearest railroad station, Gardner, 3 miles.

Oshell Bridge: 2 60-ft. riveted spans, 16-ft. roadway and wood floor on stone masonry abutments. Estimated quantities: 295.1 cu. yds. stone in pier and abutments. Foundations to be carried into rock 6 in. below stream bed. Building stone for foundation can be obtained $\frac{1}{4}$ -mile from bridge site, for the quarrying. Sand available in Kaw River, four miles from bridge site. Crushed rock must be shipped in. Nearest railroad station, De Soto, four miles.

Hassenflow Bridge: Reinforced concrete top, 30-ft. span, 16-ft. roadway, and stone masonry abutments. Estimated quantities: 24.9 cu. yds. reinforced concrete and 4,710 lbs. steel in top and 45.7 cu. yds. of stone in abutments. Excavation will be in clay, foundations to be carried 2 ft. below stream bed into rock 6 in. Building stone for the abutments can be had free 600 ft. from bridge site. Sand can be obtained in Kaw River four miles from bridge site. Crushed rock must be shipped in.

Stevenson Bridge: Reinforced concrete top, 18-ft. span, 16-ft. roadway and plain concrete abutments. Estimated quantities: 22 cu. yds. reinforced concrete and 2,628 lbs. steel in top and 64.3 cu. yds. in abutments. Foundations to be carried 6 in. into rock. Sand and crushed rock must be shipped in. Stone suitable for crushing can be had at bridge site. Nearest railroad station, Olathe, one mile.

McCoy Bridge: Reinforced concrete top, composed of three 16-ft. spans, 53 ft. 6 in. over all. 18-ft. roadway and plain concrete abutments. Estimated quantities: 45.3 cu. yds. reinforced concrete, and 6,330 lbs. steel in top and 20 cu. yds. plain concrete in piers and abutments. Foundations to be carried 6 in. into rock. Sand is available in Kaw River, three miles from bridge site. Nearest railroad station, Holliday, three miles.

Brown Bridge: Reinforced concrete top, 14-ft. span, 16-ft. roadway, and plain concrete abutments. Estimated quantities: 14.9 cu. yds. reinforced concrete and 1,770 lbs. steel in top and 57.6 cu. yds. of stone in abutments. Excavation will be in clay foundations to be carried 3 ft. below stream bed. Sand and crushed rock must be shipped in. Stone suitable for crushing can be had two miles from bridge site. Nearest railroad station, Bonita, $2\frac{1}{2}$ miles.

Lake Charles, La.—The citizens of Calcasieu Parish have voted in favor of constructing a bridge over Calcasieu River, to connect Lake Charles and Westlake. The probable cost is \$50,000. T. H. Mandell is City Engr.

New Orleans, La.—About \$9,000 will be expended by the city for improvements to the Claiborne and Magnolia Bridges. Address the City Engr.

The City Engr. has prepared estimates of the cost of constructing a bridge over New Basin Canal at Magnolia St.

Great Falls, Mont.—Bids will be received until July 24, for the construction of a 252-ft. bridge across Sun River. Address Lee Dennis, Cascade Co. Clk.

Boonville, Mo.—It is reported that a bridge will be built over the Missouri River. Interested citizens have raised \$250,000 to pay for its construction.

Freeport (L. I.), N. Y.—Two concrete bridges will be constructed on Merriek Rd., east of Main St.

Utica, N. Y.—Estimates are being prepared by G. H. Hackett, City Engr., for constructing a bridge over the Erie Canal, at Cornelia St.

Asheville, N. C.—Bids will be received until August 6, for the construction of a steel bridge across Big Ivy Creek, with a single span of 90 ft. and approaches of 20 and 34 ft. Address J. C. Valentine, Buncombe Co. Engr.

Cleveland, O.—Bids will be received by the Cuyahoga Co. Cmrs. at Cleveland, until July 27, for improving Lake Shore Blvd., No. 3; also bids for constructing concrete bridge on Cady Rd., Royalton Twp., Report No. 2940, and Cutter pavement, Ridge Rd., Parma Twp., Report No. 2767. Frank R. Lander is Co. Surv.

The bridge at Main St. will be repaired at a cost of \$10,000. Address Bd. of Loc. Imps.

Lima, O.—Bids will be received by the Allen Co. Cmrs. until July 23, for constructing four bridges.

Newark, O.—It is stated that bids will be received until July 20 by the Licking Co. Cmrs., Newark, for constructing a steel bridge. C. L. Riley is Licking Co. Aud.

North Dayton, O.—An additional \$15,000 is to be raised for the construction of a steel bridge on Keowee St., across Mad River. Address the Mayor.

Mauch Chunk, Pa.—Bids will be received at the office of the Carbon Co. Cmr., until July 19, for the construction of a new bridge across the Loyalhanna. Address the Carbon Co. Clk.

New Castle, Pa.—The Lawrence Co. Cmrs. are considering the construction of a viaduct at Gardner Ave., to be about 1,300 ft. long.

Wilkes-Barre, Pa.—Bids will be received by the Luzerne Co. Cmrs., until July 19, at Wilkes-Barre, for constructing 22 county bridges; also separate bids for a permanent floor on the Berwick-Nescopeck Bridge, across Susquehanna River at Berwick.

York, Pa.—The Cmrs. of York Co. have under consideration the improvement of the bridge at Market St. Address Pres. Bd. of Co. Cmrs.

Calgary, Alta.—Bids will be received until July 31, by J. M. Miller, City Clk., for three reinforced-concrete bridges aggregating 25 spans, across Bow and Elbow Rivers within the city limits.

Bids Received and Contracts Awarded.

Pueblo, Colo.—A contract has been awarded to the Pueblo Bridge Co. at \$1,380 for the construction of a bridge near Wigwam. Ten bids were submitted.

Prophetstown, Ill.—The contract for the construction of five reinforced-concrete culverts and bridge in Prophetstown Twp., Whiteside Co., has been awarded by Simon Kreiser, Town Clk., to L. S. Wallingford at \$2,650.

Auburn, Ind.—The Bd. of Co. Cmrs., Auburn, has awarded the contract for the construction of the proposed bridge at Newville, to George Jaap, Fort Wayne, at \$12,889.

Des Moines, Ia.—A contract has been awarded by the Cmrs. of Polk Co., for the construction of a steel bridge over the Skunk River, near Bondurant, to the N. M. Stark Bridge Co., Des Moines.

Sioux City, Ia.—It is reported that Lewis & Leeder have secured a contract for constructing a concrete bridge over Floyd River at 11th St. for \$5,000.

Boston, Mass.—The following bids were received for constructing a steel draw span over the Mystic River: Boston Bridge Works, 47 Winter St., Boston, \$117,977 (awarded contract); Northeastern Structural Co., \$120,182; Pennsylvania Steel Co., Steelton, Pa., \$130,700.

Dearborn, Mich.—A contract has been awarded to Wyncoop & McGormley, Toledo, O., at \$15,756, to construct a reinforced-concrete cantilever bridge over the River Rouge, near Dearborn.

Lincoln, Neb.—A contract to construct and repair bridges in Lincoln Co. during the year has been awarded to the Lincoln Constr. Co.

Nebraska City, Neb.—A contract has been awarded to the Wilson Reinforced Concrete Co. at \$4,875 for the construc-

tion of a concrete bridge over the South Table Creek.

Rush, N. Y.—A contract has been awarded to the Owego Bridge Co., Owego, at \$23,944, to construct the Rush-Wheatland Bridge.

Lincoln, Neb.—A contract has been awarded to the Lincoln Constr. Co., Lincoln for all bridges needed in Lancaster Co. during the ensuing year.

Salamanca, N. Y.—A contract has been awarded to the Owego Bridge Co., Owego, at \$67,972 to build a bridge at 3rd St.

Peques, Pa.—The following bids were received for constructing a 140-ft. steel span with 180-ft reinforced concrete approaches: Nelson-Merydith Co., Lewis Bldg., Pittsburgh, (a) plank floor, \$10,286; (b) wood plank floor, \$10,917; Owego Bridge Co., (a) \$10,981; A. W. Ensign, (a) \$13,004; (b) \$13,526; Lancaster Machine & Structural Wks., (a) \$11,393; Otto Paving & Constr. Co., (a) \$11,679; York Bridge Co., (a) \$12,073; (b) \$13,098.

Pittsburgh, Pa.—A contract has been awarded to the Ferris Bridge Co., Charleston, W. Va., at \$7,184, for the construction of a bridge over the Youghiogheny River.

BONDS

Carpinteria, Cal.—The Carpinteria Rd. Dist. in Santa Barbara Co., plans voting \$50,000 bonds for the construction of a proposed system of macadamized roads to cost \$85,000. The balance will be paid for out of the county's general fund.

Lordsburg, Cal.—About \$36,000 in bonds have been voted for improving city streets. Address the City Clk.

Redwood City, Cal.—The question of issuing \$1,250,000 in bonds for asphalt highways will be submitted to a vote of the people. Address the City Clk.

Brunswick, Ga.—An election will be held soon, to decide the question of issuing \$100,000 road improvement bonds. Address L. T. McKinnan, Chmn. of the Bd. of Glyn Co. Cmrs.

Washington, Ga.—An election will be held to decide the question of issuing \$30,000 street improvement bonds. Address the City Clk.

Levinston, Id.—The question of issuing \$50,000 bridge bonds, will be submitted to a vote of the people. Address the City Clk.

Turner Falls, Id.—Bonds will probably be issued to the amount of \$23,000. The proceeds will be used to build two bridges over Rock Creek.

New Buffalo, Ind.—The Vill. Council will submit to the citizens of New Buffalo a proposition to issue bonds to the amount of \$2,800. The proceeds will be used for macadamizing the principal village street.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 26,624 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the north city line of Altoona, station 374 + 99.6, to the Blair-Cambria County line, station 641 + 44, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Hollidaysburg, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$4,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 221 in Blair County, Logan Township." EDWARD M. BIGELOW, State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa.,

Hutchinson, Kan.—An ordinance authorizing an insurance of bonds to the amount of \$5,550 has been passed. The proceeds will be used for street improvement.

Alma, Mich.—Bonds to the amount of \$65,000 have been voted for paving city streets. Address the City Clk.

Ludington, Mich.—At a special election held recently it was voted to issue bonds to the amount of \$50,000. The proceeds will be used for sewer installation and paving.

Greenwood, Miss.—Bonds to the amount of \$70,000 were recently issued in Greenwood, the proceeds to be used for paving. As yet the officials have come to no decision as to the pavement most suitable to this section.

St. Joseph, Mo.—An election will be held August 10, to vote on the proposition of issuing \$1,000,000 in bonds for road improvements. Address the City Clk.

Westplains, Mo.—Bonds to the amount of \$30,000 have been voted for road improvements. Address the City Clk.

St. Louis, Mo.—An election will be held on August 5, to decide the question of issuing \$2,750, bridge bonds. Address the City Clk.

Syracuse, N. Y.—The City Council has authorized an issue of \$100,000 city park bonds.

Akron, O.—The City Council has ordered an issuance of \$90,000 sewer bonds and \$73,000 paving bonds. Ira A. Priest is Clk.

Bellefontaine, O.—The City Council has authorized an issue of paving bonds to the amount of \$3,000. J. R. Faucett is City Clk.

Cincinnati, O.—An ordinance was passed by the City Council providing for an issue of \$220,000 paving bonds. Address Simeon M. Johnson, Prest. of the Council.

Dayton, O.—Bids will be received until July 19, for the purchase of \$20,400, 4% paving and grading bonds. Address George W. Bish, City Aud.

Lorain, O.—Bids will be received at the office of the City Clk., at Lorain, until noon, July 22, for the purchase of bonds to the amount of \$48,000. The proceeds will be used for repaving Broadway.

Upper Sandusky, O.—Bids will be received by the Cmrs. of Wyandot Co., at Upper Sandusky, until July 18, for road bonds, to the amount of \$28,000.

Guthrie, Okla.—An election will be held soon to vote on the question of issuing bonds to the amount of \$25,000. The proceeds will be used in constructing a viaduct.

until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,988 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: From the borough line of Edgeworth and extending in an easterly direction to the Backbone Road, near the property of the Allegheny Country Club, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Sewickley Heights Township." EDWARD M. BIGELOW, State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 9,524 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the improved road at

Atlanta, Tex.—Bonds to the amount of \$35,000 have been voted for good roads. Address the City Clk.

Bay City, Tex.—An election has been ordered for July 20, to vote on the question of issuing bonds to the amount of \$100,000, to be used in good roads construction in Precinct No. 1, Matagorda Co.

Dublin, Tex.—An election will be held on July 23, to decide the question of issuing \$200,000 good road bonds. Address the City Clk.

El Paso, Tex.—Bonds to the amount of \$150,000 have been issued for road improvements. Address the City Clk.

Kerrville, Tex.—About \$20,000 street improvement bonds have been authorized. Address the Mayor.

Bristol, Va.—The Dominion National Bank, Bristol, was the successful bidder for \$18,000 road bonds to be issued by the Goodson Dist., of Washington Co.

Stafford, Va.—The Bd. of Svcs. of Stafford Co., Stafford, have sold an entire bond issue of \$100,000 to the Farmers' & Merchants' State Bank of Fredericksburg.

MISCELLANEOUS.

Bakersfield, Cal.—The city will purchase a street sweeper.

Fresno, Cal.—The city will purchase a street roller.

Orange, Cal.—Bids will be received up to July 15, for a street sweeper. C. W. Hallman is City Clk.

Jacksonville, Fla.—A contract has been awarded to the Buffalo Steam Roller Co., Buffalo, for furnishing one 7-ton tandem road roller. G. L. Barnard is Duval Co. Engr.

Carlo, Ill.—Bids will be received until July 16 by the Cmrs. of Highways of Rd. Dist. No. 7, at 801 Commercial Ave., Carlo, for furnishing 200 yds. more or less gravel for repair work on the Cairo and Mound City Rd., Chicago Mill to Country Club; for furnishing 300 yds. gravel, for repair work on the Cairo and Mound City Rd., Country Club to Half Way House; for furnishing 250 yds. gravel for repair work on the Cairo and Mound City Rd., Half Way House to Cache Levee; for furnishing 300 yds. gravel for repair work on road running west from Country Club to Conant's Farm; for furnishing 150 yds. gravel for repair work on road running north Conant's farm to Cache Town; for furnishing 200 yds. gravel for repair work on road running north from Cache Town to Lake Creek Bridge; for furnishing 300 yds. gravel for repair work on road running west from M. & O. R. R. to Mississippi River Rd.; for furnishing and placing 700 yds. more or less gravel, new work on road running north from present gravel to Hodges Park.

Warrendale, near Brush Creek, in a northerly direction to the Butler County line under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route 246 in Allegheny County, Marshall Township." EDWARD M. BIGELOW, State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 12,104 lineal feet of asphaltic-macadam road, 14 feet wide, situated as follows: From station 1576 + 57.35, on Route 123, near the property of D. D. Schriver, and extending in a southeasterly direction to the cross roads beyond the village of Hunterstown, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street,

Philadelphia; and at 54 Hartman Building, York, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Adams County, Straban Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 10,996 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From the Village of Woolrich, station 0 + 00, to Dunnstable township line, station 92 + 42; and from Pinecreek township line, station 99 + 82, to River Road at station 117 + 36 on Route No. 23, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton County, Pinecreek Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 740 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From Pinecreek township line at station 92 + 42, to Pinecreek township line at station 99 + 82, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut St., Philadelphia; 2117 Farmers' Bank Building, Pittsburgh; and at Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton Co., Dunnstable Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 3,510 lineal feet of brick block pavement, 16 feet wide, situated as follows: From 5th Ave. extension to State St., on Pennsylvania Ave., under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Har-

risburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Versailles Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,833 lineal feet of brick block pavement, 16 feet wide, situated as follows: From the east line of Albion borough and connecting with the State Highway in Conneaut Township, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Erie County, Albion Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 8,077 lineal feet of brick block pavement, 14 feet wide, situated as follows: From end of present improved road, station 1412 + 33, near the property of George Runyon, and extending in a north-westerly direction through Conneaut Township to station 1493 + 10, near the property of George Kenidy, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 85 in Erie County, Conneaut Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 7,400 lineal feet of telford-macadam road, 16 feet wide, situated as follows: From the property of E. S. Case through the village of Shirksville to the property of Reuben Young, station 74 + 00, under the Act of Assembly approved May

31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Lebanon County, Bethel Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA,
State Highway Department.

HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 1,790 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Beginning at the Woodland Road and extending in an easterly direction to the township line of Sewickley Heights, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Edgeworth Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

NOTICE TO CONTRACTORS

TRUNK LINE STATE ROAD WORK.

Sealed proposals for building a section of state road 4.54 miles in length on the designated trunk line in the towns of York and Wells will be received by the state commissioner of highways at the State House, Augusta, Maine, until 3 o'clock P. M., Monday, July 29, 1912.

Alternate bids will be received for the construction of concrete and bituminous macadam.

Specifications, and blank forms of proposal will be furnished upon application and a full set of plans may be seen at the office of the State Highway Commissioner, Augusta, Maine, and at the Mousam House Kennebunk, Maine.

No proposal will be considered unless made on the regular form furnished by the state highway department.

Each bidder must accompany his bid with a certified check payable to P. L. Hardison, State Commissioner of Highways, for 10% of the amount of his bid.

The successful bidder will be required to furnish a bond as provided by the state road law.

The right is reserved to reject any and all bids.

Proposals should be endorsed "York-Wells Trunk Line" and addressed to

P. L. HARDISON,
State Commissioner of Highways,
Augusta, Maine.

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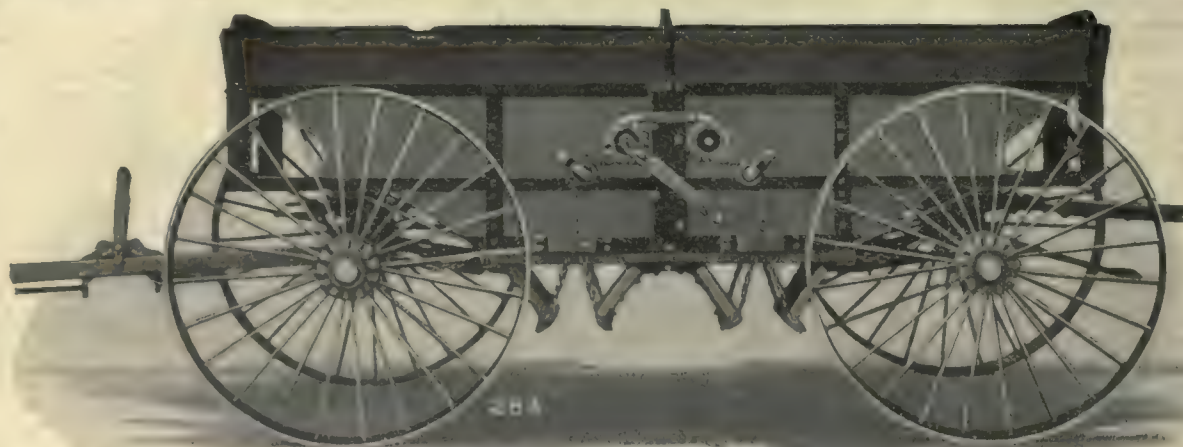
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Two New Models for 1912



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Convertible for use with engine, teams or trailers for Motor Trucks---Steel Frame---Rigid Construction---Bronze Bushed Wheels---Light in Weight---will run in either direction without turning around. Also made with Special Body for Hauling Brick. The reversing device is controlled by a **Single Lever** between each pair of cars

THE ONLY TRUE REVERSIBLE CAR MADE



The NEW BUFFALO PITTS Contractors' Road Locomotive.

Built in two sizes. Not a Bolt from the Traction Construction of this engine enters the water part of the boiler. Steel Housings and Steel Gearing throughout. These engines have a two-speed gear. The masterpiece of Scientific Construction. **THE QUALITY MACHINERY.**

BUFFALO PITTS COMPANY, BUFFALO, NEW YORK

GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
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NEW YORK, JULY 20, 1912

Number
3

Tri-State Good Roads Convention

The Tri-state good roads convention, which was held July 3 and 4 at Monte Ne, Ark., under the auspices of the Arkansas Good Roads and Drainage Association, was attended by delegates from Arkansas, Oklahoma and Missouri. State aid in the construction of an adequate system of highways was one of the principal issues of the convention, and movements were organized that are expected to accomplish much road work in the next two years.

The speaking was by progression from three open air platforms in order that the crowds of citizens might all have an opportunity to hear the various speakers. The total attendance was said to be over 5,000.

Among other features of the convention was the adoption of a resolution stating that, as local efforts at road building had proven inadequate and ineffective in Arkansas, and that Missouri and other states were making rapid progress in road work under state aid plans, it was the sense of the convention that Arkansas should adopt similar plans. It was urged that the next General Assembly should devote the state capital tax of $\frac{1}{2}$ mill to modern highway building, and that a large percentage of the convicts should be employed in road work, and that the Legislature should create a department of state highways similar to that of Missouri.

Another resolution was adopted providing for a committee to draft an adequate bill embodying a state aid road plan, the measure to be presented for passage at the next session of the Legislature. It was planned that petitions embodying the text of the proposed bill shall be circulated throughout the state for the signatures of those favoring the highway improvements. In this way the good roads enthusiasts hope to demonstrate their earnestness before the legislators.

At its closing session the convention organized permanently, and elected State Senator W. R. Rogers, of Benton County, Ark., President, giving him power to name an executive committee to arrange details for an annual meeting to be held at Monte Ne. The date has not yet been fixed.

The convention was called to order by Harry E. Cook of Lake Village, President of the Arkansas Good Roads and Drainage Association. The program follows:

Wednesday, July 3—Morning Session: Prayer by Rev. J. T. Little, Rogers, Ark.; "A Welcome to the Ozarks," W. F. D. Betjer, Benton County, Ark.; "A Welcome to Monte Ne," W. H. "Coin" Harvey; "The Visitor's Crop," LeRoy Palmer, Fayetteville, Ark.; "The Effect of Country Roads," Curtis Hill, State Highway Engineer, Columbia, Mo.; "County Road Work," Col. J. D. Sleeper, County Commissioner, Wagoner, Okla.; "Oklahoma's Department of Highways," C. W. Dawson, Muskogee, Okla.; "Good Roads for Oklahoma," Col. Sidney Suggs, State Highway Commissioner of Oklahoma, Ardmore; "Road Construction," E. J. Hahn, Little Rock, Ark.; "The Rock Road, Kansas City to Arkansas," Bud M. Robinson, Joplin, Mo., President, Western Missouri Good Roads Association; "The Development of Oklahoma," Father P. Placidus, O. S. B., Altus, Okla.; "Money, Panics, Roads," Hon. Robert W. Bonyange, Chicago, Ill. A banquet was served at 8 p. m.

July 4—"The Spirit of Arkansas As It Was and As It Is," E. B. Guthrey, President of the Northwestern Arkansas Boosters' Club, Sulphur Springs; "The Railroad the Friend of the Good Roads Movement," W. T. Tyler, General Manager of the Frisco System; "Why a Good Elk Likes Good Roads," Carl Bear, Hope, Ark.; "A Highway Over the Boston Mountains," Judge Jesse A. Harp, of Fort Smith, Ark.; "The White Way, Benton County to Fort Smith," Sam R. Chew, Van Buren, Ark.; "Missouri Road Laws," Jerome B. Grigg, Secretary Western Missouri Good Roads Association, Joplin, Mo.; "How to Make Roads 365 Days in the Year," J. D. Clarkson, Highway Commissioner, Carthage, Mo.; "Straighten the Cow Paths," O. D. Longstreth, Secretary, National Citizens League for a Sound Banking System, Little Rock, Ark.; "Why Organized Labor Will Assist in Building Roads," Hon. Chas. W. Fear Editor "Southwestern Automoblist," Joplin, Mo.; "State Highways," Prof. George A. Cole of the Arkansas State Agricultural College, Russellville; "Material for Macadam," C. H. Hoffman, M. D. Ph. D. State Chemist, Little Rock; "The Effect of Good Roads in Securing New Settlers," William Nicholson, Immigrant Agent, K. C. S. Ry., Kansas City; "Good Roads Organization," Charles P. Light, of the U. S. Office of Public Roads, Washington, D. C.; "Good Roads Construction," B. H. Burrell, Government Engineer, Washington, D. C.; "National Appropriation for a System of National Highways," Hon. S. Brundage, Searcy, Ark.; "Convict Labor for Pikes and Concrete Bridges," Judge Joseph Asher, County Judge of Pulaski County, Little Rock; "Arkansas Trap Rock for Road Building," W. W. Dickinson, President Big Rock Stone and Construction Company, Little Rock; "Good Roads and the Effect on Rice Land," Hon. Lewis K. Buerkle, Stuttgart, Ark.; "Continuation of the Great White Way to Fort Smith," E. C. Pritchard, President of the Washington County Good Roads Association, Fayetteville, Ark.; "Good Road Laws," Hon. O. C. Ludwig, former Secretary of State, Little Rock; "The Present Highway Engineer Law of Kansas, Its Possibilities," Major William J. Pearkes, Pine Bluff, Ark.; "The Great White Way, Monte Ne to Little Rock," Charles J. Griffith, General Manager Little Rock Railway and Electric Co.; "Ink," W. R. Lighton, editor "Back to the Land," and author of "The Story of an Arkansas Farm," "The Arkansas Engineer Highway Law," Senator P. A. Rodgers, Gravette, Ark.

The owners of quarries between Lock Haven and Williamsport, Pa., have signed an agreement to allow the State Highway Department to take out all the stone needed to build and repair that section of the proposed Harrisburg to Erie Highway between these two points.

A meeting of the Mobile-Selma Highway Association will be held at Pine Hill, Ala., July 24. Members of the State Highway Commission are expected to be present, and W. S. Keller, State Highway Engineer, is scheduled to give a lecture, illustrated with stereopticon views. The association was organized some time ago in the interests of a proposed highway between Mobile and Selma, Ala.



Photo. Campbell Studios, New York.

W. REES JEFFREYS.
Secy. British Road Board.

W. Rees Jeffreys Returns to England

W. Rees Jeffreys, Secretary of the British Road Board and Honorary General Secretary of the Third International Road Congress, who has spent six weeks in the United States and Canada in the interests of the Congress, which will be held at London, England, in June, 1913, returned to England, July 16, sailing from New York City on the Lusitania.

Mr. Jeffreys arrived in New York on June 4, and between that time and June 26 visited most of the larger cities in the east and middle west. During that time he met and interviewed, on the subject of the congress, a number of the men most prominently connected with road building in America, inspected many of our roads, and was entertained by various road building organizations.

On June 5, a dinner was given in his honor at the Hotel Astor, New York City, by the American Road Builders' Association, and he remained in New York until June 10, when he went to Philadelphia. In that city he was a guest of Director of Public Works Cooke.

On June 15 he gave evidence before the post office committee in connection with the post office appropriation bill on post roads. He was received by President Taft June 17. On June 18 he arrived in Chicago and spent two days in-

specting the roads and parks of that city. While there he was entertained by the Chicago Athletic Association. He visited Detroit, Mich., June 22, and inspected the concrete roads in Wayne County. On June 25 he arrived in Buffalo, and while there inspected the asphalt and brick pavements in that city. From there he went to Canada, arriving in Toronto June 26. In that city he was met by W. A. McLean, Provincial Engineer of Highways, and by the Prime Minister of the province. He arrived in Ottawa July 1, and there met Acting Prime Minister Perley, and from there went to Montreal, arriving July 4. Four days later he visited Quebec, and from Quebec went to Boston, and thence to New York, where he spent two days before sailing.

While in Boston, Mr. Jeffreys was the guest of Col. Wm. D. Sohler, Chairman of the Massachusetts State Highway Commission, and inspected the roads in some of the principal parks of the city.

He granted an interview to the "Boston Evening Transcript," in which he expressed his ideas on the development of the transportation of merchandise and passengers by motor vehicles in America and its relationship to the construction of proper continuous roads. He also explained the progress in England along these lines, stating that motor omnibuses are taking the place of branch railways all over the country, and that a large share of the goods delivered within 40 miles of the principal centres of population were being delivered by motor vehicles. This progress has been made possible by the construction of good roads. He stated that, in this respect, Massachusetts more nearly approached England than any other state in this country.

The methods of the British Road Board were explained by Mr. Jeffreys in this interview and some examples of English road work were cited.

Mr. Jeffreys dwelt on the importance of maintenance, and stated that one reason why Massachusetts has made such progress is that it has a highway commission that appreciates the value of continuous maintenance. He also stated that in some parts of the United States large sums of money are being wasted because, after appropriations are made and the roads built, no further attention is paid to them and no appropriation made for constant repair.

Mr. Jeffreys expressed himself as having had a very pleasant trip while in this country, and regretted that he was unable to stay longer. He also stated that those whom he had met had expressed a desire to cooperate in making the Third International Road Congress a success.

Jericho Turnpike Reopened

The Jericho Turnpike, which is the main highway of the north side of Long Island, was opened July 12 after having been closed for nearly two years, at points east of Woodbury.

The new section, which is 14 miles long, extending from the Nassau County line to the bridge over the Missequogue River at Smithtown, has been rebuilt by the state at a cost of over \$10,000 a mile. Eleven miles of the distance are built of tar and gravel coating on a concrete foundation. The last three miles are of asphalt macadam construction.

The turnpike is reached from New York by way of the Hoffman Blvd. and Hillside Ave., and runs from the village of Queens through Floral Park, East Williston, Jericho, Woodbury and Commack to Smithtown.

The report of the Highway Department of Denver, Colo., for April, 1912, shows that during the month 6,312.87 sq. yds. of street patching was done at a total cost of \$5,270.85 for material and labor or approximately 83½ cents per sq. yd. Asphalt concrete was laid on Speer Blvd., \$5,434.31 being spent in the purchase of supplies, and \$10,518.05 in labor.

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JULY 20, 1912.

Cement Shows for Next Winter

According to announcements which have been issued by the Cement Products Exhibition Co., cement shows will be held next season in Pittsburgh and Chicago, New York and Kansas City being omitted.

The date set for the Pittsburgh cement show is December 12 to 18, 1912. The show, which will be the city's first cement show, will be held in Exhibition Hall, Duquesne Way. The annual Chicago exhibition will be held in the Coliseum, January 16 to 23, 1913.

President Richard L. Humphrey of the National Association of Cement Users, has also announced that the ninth annual convention of that organization will be held in Pittsburgh in December in connection with the cement show. In issuing the statement regarding the shows, President Edward M. Hager of the Cement Products Exhibition Co., gives among the reasons for choosing Pittsburgh, the fact that it is centrally located and readily accessible from all points in a large and important concrete using territory.

J. P. Beck is general manager, and F. E. Guy is traffic manager.

Proposed Illinois Transcontinental Highway

The Illinois Transcontinental Route Association has recently issued a blueprint of the proposed road between Chicago and Clinton, Ia., for which the organization is sponsor.

This map was made in the office of the state highway commissioner after an inspection of the route by the state engineer. The road across Illinois parallels the Northwestern Railway, passing through Maywood, Wheaton, Geneva, De Kalb, Rochelle, Dixon, Sterling, Morristown and Fulton at the Iowa line where the Mississippi River is crossed.

A great part of this road at present is of macadam construction. The stretches of dirt road are to be improved immediately. Marking of the route will begin in a few days. The marks will be white bands, one foot high, on the telephone poles with the letter "T" in the center of the bands. They will be large enough to be read clearly and easily from the middle of the road, and will show the directions and distance from each cross road to all towns within a radius of 50 miles.

New Roads in Nassau County, New York

The county supervisors of Nassau County, N. Y., have awarded contracts for the rebuilding of four county roads in the town of Hempstead, for which funds were provided in a recent bond issue amounting to \$240,000.

The highways to be rebuilt are Franklin St., from Mineola to Hempstead; Bethpage Turnpike, from Hempstead east; the Rockaway turnpike in Cedarhurst and Lawrence, and the Merrick road from Rockville Center to Freeport.

All these county roads are, at present, in bad condition in the sections where it is proposed to rebuild. In all cases, except the Rockaway turnpike contract, the county furnished the material, the bids being for furnishing tools, machinery and labor.

The contract for the Franklin St. work provides for scarifying the roadbed and spreading 4 ins. of 1½-in. trap rock, filled with ¾-in. stone and finishing with Bermudez asphalt binder, poured in two courses and covered with a ½-in. stone. Where necessary, a bottom course of 4-ins. of stone filled with sand and rolled will be placed before the resurfacing is done. Warrenite is the surface to be placed on the Rockaway Turnpike. Meredith Road is being treated in the same manner as Franklin St.

That section of the Jericho Turnpike situated in the town of North Hempstead is also to be built with the proceeds of the \$240,000 bond issue. The contract for the work has not yet been awarded.

Convention of the Southern Appalachian Good Roads Association

At a meeting of the executive committee of the Southern Appalachian Good Roads Association, held in the rooms of the Chamber of Commerce, in Atlanta, Ga., July 6, it was decided to hold the annual convention of the organization at Atlanta, Nov. 20-21, during the week of the Atlanta Automobile Show. The committee decided to make the Piedmont Hotel the headquarters of the convention, and to hold the convention itself in the Piedmont Assembly Hall.

The exact number of sessions has not yet been decided upon, but it is stated that there will be at least three or four during the two days of the convention.

New Bridges in Rhode Island

The State Board of Public Roads of Rhode Island has awarded contracts for the reconstruction of a number of bridges throughout the state. The most important of these are at Barrington and at Warren. The Barrington bridge work was awarded to a Boston contracting firm at \$107,874. A firm of Albany contractors is to rebuild the Warren bridge at a cost of \$29,600.

Bridges will also be built at Hopkins Mills, Centerville, Millville, Wilbur, Locust Wood, Wilbur's Hollow and Coventry.

Seven contracts for the building of small bridges were held up because the bids received were too high, and they will be advertised again.

Proposed Paving in Pueblo, Colo.

Street improvement estimated to cost \$112,563.96 will be made in the near future in Pueblo, Colo. The improvement, which includes 61,350.8 sq. yds. of paving, 38,081.1 lin. ft. combined curbing and gutter, 24,871.2 cu. yds. of excavation and the installation of a considerable amount of storm sewer will be made in what is known as the Court House Paving District, bounded by 10th, 16th, Elizabeth and Santa Fe Streets.

Resolutions calling for bids on this work were passed July 9 at a special session of the City Commissioners.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. J. E. Pennybacker, Secretary, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

General News

The citizens of Atlanta, Ga., have voted to issue bonds to the amount of \$2,000,000 for road improvement.

Bonds to the amount of \$70,000 have been voted for road improvement in Tom Green County, Tex.

A \$500,000 road bond issue has been approved by the Council Committee of Ways and Means of Cincinnati, O.

The Commerce Club of St. Joseph, Mo., has decided to start a campaign in behalf of the proposed \$1,000,000 bond issue, to be used for road improvement.

The Board of Control of Cincinnati, O., has awarded a contract to the Kirchner Construction Co. for paving Ravine St. and Belldare Ave. at \$110,052.

A meeting will be held in Grand Forks, N. D., by the North Dakota Meridian Road Association in order to decide upon the route to be taken by the Meridian automobile highway.

The Board of Supervisors of Orleans County, N. Y., has authorized the selling of road bonds to the amount of \$21,750 on July 24 for road improvement in Albion.

The Quarterly Court of Lawrenceburg, Tenn., has ordered an election to be held on Oct. 5 to decide whether or not road improvement bonds to the amount of \$200,000 shall be issued.

A good roads celebration will be held on July 27 at Pangburn, Ark., the purpose being to further the good roads movement. Addresses will be made by Judge Joe Asher, O. D. Lonstreth and others.

A good roads meeting will be held by the citizens of Moundsville, W. Va., at Phillips Grove, August 7. A parade of automobiles in the surrounding sections will be one of the features of the day.

An examination to secure eligibles for the position of steel bridge de-

signer in the Philippine Service will be held on July 29 by the United States Civil Service Commission at Washington, D. C.

The Montana Good Roads Association at a meeting held in Anaconda, Mont., elected the following officers: President, E. P. Mathewson, Anaconda; First Vice President, D. P. Curran; Treasurer, A. J. Davis; Secretary, Martin Martin.

The Board of Estimate and Apportionment of New York City has ignored the protest of property owners at assessment in connection with the Roebeling St. improvement at the Bridge Plaza. The cost of the work is estimated at \$650,000.

A bill authorizing the creation of a highway commission is arousing considerable interest among the farmers in Glynn County, Ga. If the bill should pass, it would mean that each county in the state would receive expert assistance in road construction.

The Colorado Good Roads Association is making a determined effort to increase its membership. With this object in view a convention will be held under the auspices of the Colorado Good Roads Association, the Greater Colorado Highway Association and the County Commissioners Association.

The residents of Sea Breeze, N. J., will hold a celebration on July 30 in honor of the new state road between Durana-Eastman Park and the Irondequoit bay outlet, which was recently opened. The road is built on a concrete foundation with an asphalt surface.

A resolution to legally open Skillman Ave., Long Island City, N. Y., from the angle between Hulst and Van Pelt Sts. to Wood Ave., Woodside, was passed by the Newtown Local Board recently. The Board also resolved to open Nott Ave., from Vernon Ave. to the pier and bulkhead line.

Personal Notes

Harry P. Willis, Chief Engineer of the State Highway Department of New York, has resigned.

Wm. Davis has resigned as City Engineer of Prince Rupert, B. C. Mr. Davis has served in that capacity for a number of years.

Bruno L. Durst has been appointed City Engineer of Port Arthur, Ont. Mr. Durst succeeds C. E. Dunwoodie, who recently resigned.

Webster Beymer, formerly an Inspector in the Street Sweeping Department in Montgomery County, D. C.,

died suddenly of heart failure near his home in Potomac Dist.

F. H. Lewis, R. A. Farnsworth and Charles E. Chidsey have been appointed Road Commissioners of the 3rd Dist. in Pascagoula, Miss.

John A. Pettigrew, who was formerly Superintendent of Parks in Boston, Mass., and also at various periods in Brooklyn, N. Y., Milwaukee, Wis., and Chicago, Ill., died July 2 in Boston.

Mrs. Amzi L. Barber, widow of Amzi L. Barber, founder of the Barber Asphalt Paving Co., died suddenly on board the Congressional limited, as the train was leaving Baltimore, Md.

Irving W. Barbour has resigned his position as Field Engineer in the Water Department of Portland, Ore., to become a Highway Engineer with the U. S. Office of Public Roads, Washington, D. C.

William L. Vennard has been appointed head of the City Engineer's Department of Lynn, Mass., to fill the vacancy caused by the death of George I. Leland. For the past 22 years Mr. Vennard has been a member of the staff of the City Engineer's office.

Joshua V. N. Williams, formerly Superintendent of Streets of Binghamton, N. Y., died on July 12 at his home, 6 Irving Ave. Mr. Williams, who was 59 years old, had been afflicted with heart trouble for the last year. Previous to his appointment to the office of Superintendent of Streets, Mr. Williams was a Supervisor in the 11th Ward for a number of years.

Trade Notes

The Creosoted Wood Paving Block Association has moved its offices to the Otis Building, 10 South La Salle St., Chicago, Ill.

The Alpha Portland Cement Co., Easton, Pa., has issued an interesting booklet entitled "Ground Limestone for Acid Soils." The booklet contains instructive articles on this subject.

A pamphlet entitled "The Science of Mixing Concrete" has been issued by the Austin Cube Mixer Co., Railway Exchange, Chicago, Ill. The pamphlet contains articles on methods of mixing concrete and illustrations of the Chicago Improved Cube Mixer.

The Municipal Engineering and Contracting Co., Railway Exchange Bldg., Chicago, Ill., has issued an attractive catalogue descriptive of its "Chicago Improved Cube Concrete Mixer." The catalogue is 6 ins. by 9 ins. in size and contains 72 pages, in which are many illustrations showing the company's mixers.

CONTRACT NEWS

ROADS AND STREETS

Contracts Pending

Date of letting	Reported in issue of	
7-20	Riverton, Ill., cement sidewalks	7-20
7-20	Cambridge, O., bridge, paving, etc.	6-29
7-20	Cleveland, O., concrete, culvert	7-6
7-22	Peoria, Ill., rd. impt.	7-20
7-22	Columbus, Ga., brick sidewalk	7-20
7-22	New Lexington, O., paving	7-20
7-22	Statesville, N. C., rd. impt. bonds	7-20
7-22	Fargo, N. D., paving, etc.	7-20
7-23	Louisville, Ky., rd. impt.	7-20
7-24	Millersburg, O., paving, etc.	7-20
7-24	Millersburg, O., grading and paving	7-20
7-24	Lorain, O., paving bonds	7-13
7-23	Clinton, Ia., grad., paving, etc.	7-13
7-24	Troy, N. Y., paving	7-13
7-24	Mechanicsville, N. Y., paving	7-13
7-24	Struthers, O., paving bonds	7-6
7-25	Delphi, Ind., gravel rd.	7-13
7-25	Pikesville, Ky., brick paving	7-13
7-25	Wooster, O., paving	7-20
7-25	Benson, Neb., paving, etc.	7-20
7-25	Bryan, O., paving	7-20
7-25	Sayre, Pa., rd. const.	7-20
7-26	Troy, O., paving	7-20
7-27	Zanesville, O., grading and paving	7-20
7-27	Cleveland, O., paving	7-13
7-23	Augusta, Me., rd. const.	7-13
7-29	Newark, O., paving	7-13
7-29	Lisbon, O., rd. bonds	7-20
7-29	Morristown, N. J., macadam rd.	7-20
7-30	Painesville, O., paving, etc.	7-20
7-30	North Toronto, O., paving	7-13
7-30	Harrisburg, Pa., rd. work	7-13
7-31	Xenia, O., paving	7-20
7-31	Providence, R. I., highway	7-13
8-1	Walla Walla, Wash., paving	7-20
8-1	Jackson, Miss., rd. bonds	7-20
8-2	Toledo, O., rd. impt.	7-20
8-5	Atchison, Kan., rd. impt.	7-20
8-6	Oaklyn, N. J., rd. impt.	7-20
8-7	Macon, Miss., rd. const.	7-20

BRIDGES

7-20	Port Huron, Mich., bridge	7-20
7-20	Bayles, Ill., reinforced concrete bridge	7-20
7-22	Plymouth, Ind., bridge const.	7-13
7-22	Helena, Ark., bridges	7-13
7-23	Lima, O., bridges	7-13
7-24	Great Falls, Mont., steel bridge	7-20
7-24	Ashland, O., bridge	7-20
7-24	Providence, R. I., bridge	7-20
7-24	Sims, Mont., bridge	7-20
7-29	Delaware, O., bridge	7-20
7-29	Palmyra, Va., bridge	7-20
7-31	Calgary, Alta., bridge	7-20
8-1	Batesville, Miss., concrete bridge	7-20
8-2	Cleveland, O., bridge work	7-20
8-6	Tampa, Fla., bridge	7-20
8-10	Port Huron, Mich., bridge	7-20
9-4	Tellulah, La., bridge	7-20

ROADS AND STREETS

Bids Asked and Prospective Work

Decatur, Ala.—About \$15,000 will be expended improving streets. Address the City Clk.

Greenville, Ala.—Bids will be advertised soon for letting out the contract for building the Forest Home Rd. This road leads out west of Greenville to Forest Home, a distance of about 15 miles. The road will be a state model highway, money being furnished by the county and state.

Talladega, Ala.—About \$25,000 will be expended paving the public square, Battle, East, Court and North Sts. Address the City Cmr.

Marianna, Ark.—The City Council will pave several streets. Address the Mayor.

Calro, Ill.—The members of the Retail Merchants' Assn. will petition the City Council to pave 28th St. from Park Ave. to the western end of the street. Address the City Clk.

Elgin, Ill.—The Council has unanimously voted to construct a 30-ft. driveway in Beaver St.

Joliet, Ill.—H. A. Stevens, City Engr., has prepared plans for paving Eastern Ave. between Cass St. and 3rd Ave. Address the City Engr.

Paris, Ill.—The City Council will pave several streets throughout the city. Address the City Clk.

Peoria, Ill.—Bids will be received by the City Council until 2 p. m., July 22, in Room 306, City Hall, for improving the roadway of Chambers Ave. from N. University to Elizabeth St. The following is

an approximate estimate of the material and labor required for such improvement, viz.: 4,700 cu. yds. of excavation; 320 lin. ft. of protection curb; 5,100 lin. ft. of Std. No. 1 cement curb complete; 9,420 sq. yds. of concrete foundation, 5 inch; 9,420 sq. yds. of sand cushion, 2 inch; 9,420 sq. yds. of brick pavement; 9,420 sq. yds. of grout filler, pitch expansion joints.

Pontiac, Ill.—The City Council will pave N. Plaza St. from Livingston St. to Water St. Address the City Clk.

Riverton, Ill.—Bids will be received until 7 p. m. July 20 by the village of Riverton at the office of the Vil. Clk. for the construction of approximately 3,600 lin. ft. of cement sidewalk. Specifications may be seen at the office of the St. Cmr.

Rock Island, Ill.—The Bd. of Loc. Imps. has voted to recommend the adoption of a resolution authorizing the paving of 19th St., between 2nd and 3rd Aves., with brick.

Sterling, Ill.—The City Council is planning to pave many streets throughout the city. Address the City Clk.

Clairinda, Ia.—The City Council is planning to pave many streets here. Address the City Clk.

Des Moines Ia.—The City Council recommends the paving of Washington Ave. with asphalt pavement. Address the City Clk.

Des Moines, Ia.—The City Council is planning to pave many streets throughout the city with asphalt pavement. Address the City Clk.

Iowa City, Ia.—The Council is planning to pave many streets. Address the City Clk.

Kansas City, Kan.—Resolutions have been adopted by the Bd. of Cmr. for improving various streets and avenues in the city. G. R. Little is City Clk.

Atchison, Kan.—Bids will be received until Aug. 5 by the Bd. of Co. Cmr. for the improvement of a road in Walnut Twp. Edwin Iverson is Co. Clk.

Louisville, Ky.—Bids will be received at the office of the Bd. of Pub. Wks. until 2 p. m. July 23 for street improvement as follows: From Hill St. to the first alley north of Hill St. and being the first alley east of Seventh St.; from Seventh St. to Ninth St. and being the first alley south of Magnolia Ave.; from Seventh St. to Ninth St., being the first alley north of Hill St.; from Colgan St. to a line 133 feet north of Colgan St. and being the first alley west of 18th St.; from 29th St. to 18th St., between Kentucky St. and Greenwood Ave.; from 26th St. to 28th St. and between Kentucky St. and Greenwood Ave.; from 22nd St. to 23rd St. and being the first alley south of Griffith Ave.; from a line 202.5 feet north of Frankfort Ave. to a line 833.76 feet north of Frankfort Ave. and being the first alley north of Haldeman Ave.; from Burnett Ave. to the first alley north of Burnett Ave. and between Shelby St. and Hoertz Ave.; from Baxter Ave. to Moss Rose Ave., being the first alley west of Windsor Pl.

Louisville, Ky.—The Bd. of Pub. Wks. will advertise for bids for the improvement of Brook St., from Avery to G Sts., by paving with vitrified blocks.

Eldorado, Kan.—Ordinances are stated to have been passed providing for the paving of six blocks on Central Ave. and Main St.

Fitchburg, Mass.—The City Council will pave Mechanic St. with wood block pavement. Address the City Clk.

Bay City, Mich.—Bids will soon be received for approximately 20,000 sq. yds. of paving. Address the City Clk.

Port Huron, Mich.—Bids will be received until Aug. 10 for the construction of a bascule lift bridge across Black River, Port Huron. Plans and specifications are on file with City Clk. Address Gordon Ross, City Clk.

Macon, Miss.—Bids will be received by the Rd. Cmr. of Dist. 3, Noxubee Co., at their office in the Courthouse at Macon, until 2 p. m. Aug. 7, for the building of approximately 24.5 miles of sand-clay road in Dist. 3. The work will include approximately 38,000 yds. of earth excavation and the hauling, placing and spreading of the sand-clay required for surfacing these roads.

East St. Louis, Mo.—The City Council has voted to improve Exchange Ave. from

9th to 18th Sts. The estimated cost is \$45,223.

St. Louis, Mo.—The City Council will pave Locust St. from 14th to 13th Sts. at a cost of \$4,000. Address J. C. Travilla, St. Cmr.

Benson, Neb.—Bids for the improvement of Military Ave. from 54th St. to Orphanage Ave., in the City of Benson, by paving, guttering and curbing, will be received by the Mayor and Council until 8:30 p. m. July 25. The estimated cost of the improvement is \$30,000.

Lincoln, Neb.—The City Engr. and Attorney have been directed by the Council to prepare an ordinance creating a paving district on D St., between 20th and 27th Sts.

Moorestown, N. J.—Bids will be received by the Twp. Com. until July 29 for building a macadam road on Maple Ave.

Oaklyn, N. J.—Bids will be received by F. B. Lewallen, Boro. Clk., until Aug. 6, for the construction of a concrete curb and gutter on Newton Ave., between Clinton and Collingwood Aves.

Rensselaer, N. Y.—The Common Council directed the paving and improvement of the following streets, bids to be received Aug. 6: With granite block, John, from Broadway to Third; Glen and Pine, from Broadway to Third; with brick, Broadway, from Columbia to end of pavement on Riverside; Third Ave., from Green to Washington; Second, from John to McNaughton Ave.; John, from Third to Fourth; Sixth, from Partition to John; Academy, from Columbia to Alken Ave.

Raleigh, N. C.—The City Engr. is preparing plans for concrete sidewalks to be erected in several streets throughout the city. Address the City Engineer.

Fargo, N. D.—Bids will be received until July 22 for the paving and curbing of Ninth St., south from the south line of Ninth Ave. Address A. R. Watkins, City Aud.

Bryan, O.—Bids will be received until July 25 for furnishing all labor and material for paving with vitrified paving brick, asphalt block, sheet asphalt, etc., Wilson St., E. High St., S. Main St. Address John A. Neill, Vil. Clk.

Cleveland, O.—Bids will be received until Aug. 3 for the construction of bridge work per Report No. 2,012 culvert, Euclid Heights Blvd. Address John F. Goldenbogen, Clk.

Elyria, O.—About \$27,000 will be expended for highway improvements. Address the City Clk.

Painesville, O.—Bids will be received at the office of the Cmr. of Lake Co., at Painesville, until 10 a. m. July 30 for grading and paving with a bituminated concrete the Weeds Corner Rd. in Leroy Twp., Lake Co. The proposed improvement will be 11,686 ft. long, 12 ft. wide and is estimated to cost \$21,357. Plans and specifications are on file in the office of the Co. Cmr. and State Highway Dept.

Millersburg, O.—Bids will be received at the office of the Cmr. of Holmes Co., at Millersburg, until 1 p. m., July 24, for grading and paving with a bituminated concrete Sect. 3 of the Millersburg and Berlin Rd. in Hardy Twp., Holmes Co. The proposed improvement will be 1,795.5 ft. long, 16 ft. wide, and is estimated to cost \$5,593.52. Plans and specifications on file in the office of the Co. Cmr.

Bids will be received at the office of the Cmr. of Holmes Co. at Millersburg until 1 p. m. July 24 for grading and paving with brick for medium traffic Sect. 2 of the Millersburg and Nashville Rd. in Hardy Twp., Holmes Co. The proposed improvement will be 4,817.6 ft. long, 10 ft. wide, and is estimated to cost \$14,309. Alternate bids will also be considered for grading and paving with a bituminated concrete. The estimated cost is \$10,616. Plans and specifications are on file in the office of the Co. Cmr. and the State Highway Dept., Columbus.

New Lexington, O.—Bids will be received until July 22 by T. B. Skinner, Vil. Clk., for paving with brick a portion of Maple Heights St.

Springfield, O.—It is stated that the Cmr. of Clark Co. will macadamize 2½ miles of Urbana Pike, estimated cost \$8,000, and 2½ miles on Selma Pike, estimated cost \$8,000.

Troy, O.—Bids will be received by the Cmr. of Miami Co., at Troy, until noon, July 26, for grading and paving with a bituminated concrete Sect. No. 3 of the

Elqua and Troy Rd., in Washington and Concord Twp., Miami Co. The proposed improvement will be 21,909 ft. long and is estimated to cost \$13,202. Plans and specifications are on file in the office of the Co. Cmsr. and the State Highway Dept., Columbus.

Washington, O.—The Cmsr. of Fayette Co. awarded a contract on July 1 to Hudson & Sumway, Portsmouth, at \$14,447 for grading and paving with concrete the Devalon Rd. in Union and Paint Twp., Fayette Co. The proposed improvement will be 10,560 ft. long, 14 ft. wide and was estimated to cost \$15,184.

Wooster, O.—Bids will be received at the office of the Cmsr. of Wayne Co., at Wooster, until 10 a. m., July 25, for grading and paving with brick for medium traffic the Dalton Ext. Rd., in Sugar Creek Twp., Wayne Co. The proposed improvement will be 5,632 ft. long, 10 ft. wide and is estimated to cost \$14,640. Plans and specifications are on file in the office of the Co. Cmsr. and the State Highway Dept., Columbus.

Xenia, O.—Bids will be received at the office of the Cmsr. of Greene Co., at Xenia, until 10 a. m., July 31, for grading and paving with a gravel macadam the Wilmington Rd. in Caesar Creek Twp., Greene Co. The proposed improvement will be 4,357 ft. long, 14 ft. wide and is estimated to cost \$3,645. Plans and specifications are on file with the Co. Cmsr. and State Highway Dept., Columbus.

Bids will be received at the office of the Cmsr. of Greene Co., at Xenia, until 10 a. m., July 31, for grading and paving with a gravel macadam the Dayton and Springfield Rd., in Bath Twp., Greene Co. The proposed improvement will be 10,663 ft. long, 14 ft. wide and is estimated to cost \$4,712. Alternate bids and paving with a sulphite liquid treated gravel road. Estimated cost, \$4,107. Plans and specifications are on file in the office of the Greene Co. Cmsr. and the State Highway Dept., Columbus.

Zanesville, O.—Bids will be received at the office of the Cmsr. of Muskingum Co., at Zanesville, until 10 a. m., July 27, for grading and paving with brick for heavy traffic the Marysville Rd. in Springfield Twp., Muskingum Co. The proposed improvement will be 3,787 ft. long, 16 ft. wide and is estimated to cost \$11,524. Plans and specifications are on file in the office of the Co. Cmsr. and the State Highway Dept., Columbus.

Sayre, Pa.—Bids will be received until July 25 for the construction of 6,500 lin. ft. of combined concrete curb and gutter. Address H. H. Mercierbeau, Boro. Ck.

Providence, R. I.—Bids will be received until noon, July 31, by the State Bd. of Pub. Rds., at Providence, for the construction of a section of state highway in the Towns of Smithfield and North Smithfield, about 9 miles in length; a section in the Town of Burrillville, about 1 mile in length; a section in the Town of Coventry, about 1.1 miles in length; a section in the City of Cranston, about .5 mile in length; a section in the Town of Bristol, about 1 mile in length; a section on the Mendon road, near Woonsocket, about 1 mile in length.

Spokane, Wash.—The City Council is planning to pave many streets throughout the city. Address the City Ck.

Bids Received and Contracts Awarded

Coronado Beach, Cal.—The following bids were received for the construction of the rock and earth seawall on Ocean Blvd.: J. C. Corbaley Const. Co., Wilcox Bldg., Los Angeles, \$1.87 per ton for rock, 30c. per cu. yd. for back fill; H. J. Eaton, Coronado, \$2.25 and 40c. The cost will approximate \$75,000.

Santa Monica, Cal.—Fred H. Stout, Bradbury Bldg., Los Angeles, has received the contract for improving 20,000 lin. ft. of streets in a new tract here for C. L. Bundy. The work will consist of grading, macadamizing and constructing cement curbs and sidewalks. Jos. A. Hurley, Thorpe Bldg., Los Angeles, is the Engr.

Vernon, Cal.—The Fairchild, Gilmore Wilton Co. was awarded the contract at \$41,048.95 for improving Vernon Ave., Jaboneria Rd. and San Antonio Ave. The work will require 192,180 sq. ft. of asphalt paving, 19,225 lin. ft. of cement curb and 17,233 cu. yds. of grading. The paving will have a 6 in. concrete base, 1 in. binding course, and 2 in. wearing surface. Jos. A. Hurley, Thorpe Bldg., Los Angeles, is City Engr.

Aledo, Ill.—The Bd. of Loc. Imps. received bids for the construction of 86,470 sq. yds. concrete pavement, 54,240 lin. ft.

of curbing and 92,000 sq. yds. of grading, and has awarded the contract to the Advance Constr. Co., Waukesha, Wis., at \$95,354.

Paxton, Ill.—A contract has been awarded to E. J. Westbrook, Paxton, at \$12,894 for paving E. Paxton St.

Winamac, Ind.—The contract has been awarded Joseph Jenkins, of Michigan, at \$12,900 for paving Logan St.

Des Moines, Ia.—The following contracts were awarded by the City Council: Paving Grand Ave. with creosote blocks, O. P. Herrick, \$4.75 per yd.; curbing 32nd, University to Carpenter, J. P. Hansman, 31c. per yd.; curbing West Eleventh St., Enos to School St., Wagner Constr. Co., 31c. per yd.; curbing West 37th, Ingersoll to Woodland, Wagner Constr. Co., 31c. per yd.; asphalt paving Country Club Blvd., Des Moines Asphalt Co., \$1.86 per yd.

New Iberia, La.—The City Council has awarded the contract for paving 6,290 ft. on E. Main St. with sand and gravel, from Weeks St. to the intersection of Main St. with the Jefferson Rd., to the Chatham Constr. Co., at \$16,335.

Portland, Ore.—The following bids were received for the construction of 8,092 cu. yds. of State Rd. in accordance with specifications furnished by the State Highway Cmr.: Shawmut Constr. Co., of Boston, \$11,849.60; John W. Gulliver, Portland, \$12,911.83; Murphy Bros., Boston, \$11,842; Hassam Paving & Constr. Co., \$11,733.75; Forgiione & Romano, Portland, \$14,217.53.

Oregon City, Ore.—The Oregon Eng. & Constr. Co. has been awarded the contract of macadamizing John Quincy Adams St. from Eighth to Fourteenth, Jackson St. from Twelfth to Sixteenth, and Sixteenth St. from Division to Jackson. The work must be completed in 120 days.

Youngstown, O.—The Cmsr. of Mahoning Co. have awarded a contract to Fleming & Platt, Youngstown, at \$25,963 for grading and paving with brick for medium traffic the Youngstown-Struthers Rd., in Cortsville Twp., Mahoning Co. The proposed improvement will be 6,177 ft. long, 21 and 23 ft. wide and was estimated to cost \$26,377.

Harrisburg, Pa.—The following are the successful bidders on more than 20 miles of State Rd.: Decatur Twp., route No. 57, 10,756 ft., Baker-Owen Constr. Co., Johnstown, \$40,791.08; Lehigh Co., North Whitehall Twp., route No. 163, 16,300 ft., Neff & Horn, Slatington, \$54,992.74; Berks Co., Hereford Twp., 8,048 ft., J. F. Shanley Co., Philadelphia, \$21,576.14; Bucks Co., Falls Twp., 10,115 ft., J. F. Shanley Co., Philadelphia, \$27,331.37; Washington Co., Charleroi Borough, route No. 118, Hastings & Piper, Charleroi, \$17,907.48; Blair Co., Frankston Twp., 49,394 ft., repair work, H. K. Hinkle & Co., Altoona, \$34,472.05; Mercer Co., East Lackawannock Twp., 9,632 ft., Northwestern Constr. Co., Franklin, \$35,817.09; Mercer Co., route No. 74, 14,807 ft., Southshore Constr. Co., Erie, \$50,139.50; Jefferson Co., Young Twp., route No. 63, 13,735 ft., Southshore Constr. Co., \$53,116.39; Northumberland Co., route No. 101, 40,143 ft., Monroe Paving Co., \$142,573.15; Delaware Co., 18,843 ft., G. Ralph Marsh, Philadelphia, \$67,042.80.

Wilkes-Barre, Pa.—The following bids were received for paving the extension of Bennett St.: John E. James, \$2.23 for brick and 74c. for curbing; D. M. Rosser, \$2.38 and 75c.; Davis & Parry, \$2.23 and 75c.; Warren, Quinlan Co. \$2.27 and 75c. The latter concern also submitted a bid of \$2.09 a sq. yd. for asphalt. Mr. James was also the lowest bidder on Scranton brick, his bid being \$2.06. Mr. James was also awarded the contract for paving Bennett St., the expense of which is to be borne by the Myers estate. His bid was \$2.09 for C. C. W. brick and 74c. for curbing. The contract for erecting a retaining wall on Scott St., near Conyngham Ave., was awarded to the Herrick Constr. Co., lowest bidder, for \$189.60. The only other bid was \$312.

BRIDGES.

Bids Asked and Prospective Work.

Alameda, Cal.—The Co. Surv. is completing plans and bids will be received soon for a bridge 500 ft. long by 30 ft. wide, to be erected at Niles. The entire surface of the bridge will be covered with granite.

Tampa, Fla.—Bids will be received until Aug. 6 at the office of the Bd. of Pub. Wks., Room 28, First National Bank Bldg., for constructing a reinforced concrete retaining wall and bulkhead at the east approach to the Fortune St. bridge. Plans

and specifications can be obtained at the office of the City Engr. Address Allen Thomas, Ck.

Lacon, Ill.—The Lacon City Council is planning to expend \$100,000 in building a new bridge. Address the City Attorney.

Topeka, Kan.—A. R. Young, City Engr., is preparing drawings and specifications for the erection of twelve bridges to span the Shunganunga Creek. Address the City Engr. The estimated cost is \$140,000.

Tallulah, La.—Bids will be received until Sept. 4 for the construction of the following bridges: First, over Willow Bayou on the road leading north, 80-ft. span; over Panther Lake, 64-ft. span; over Sut Bayou, south of Waverly, 120-ft. span; fourth, over Little Fork, south of Waverly. Said bridges to have concrete abutments and capable of sustaining the weight of a 20-ton traction engine. Roadway, 12 ft. Address W. H. Harvey, Secy.

Port Huron, Mich.—Bids will be received until noon, July 20, for constructing a double-bascule bridge over Black River, at Military St., estimated to cost \$75,000. Plans prepared by the Osborn Eng'g Co., Eng's Bldg., Cleveland, O.

Port Huron, Mich.—Bids will be advertised for soon for the construction of a bascule bridge, the roadway of which will be 40 ft. wide and each sidewalk will be 13 ft. in width. Address Gordon Ross, City Ck.

Batesville, Miss.—Bids will be received until Aug. 1 for the construction of a steel bridge across Hotopka Creek and a concrete bridge over Jones ditch. Plans and specifications on file in the office of the Chancery Ck. in Batesville, Miss. Address R. F. Draper, Clerk.

Meridian, Miss.—The City Council will expend \$10,000 constructing bridges, culverts, etc. Address J. W. Parker, Mayor.

Meridian, Miss.—About \$10,000 will be expended to construct bridges, culverts, etc. Address J. W. Parker, Mayor.

Clinton, Mo.—The Henry Co. Court has ordered that a 32-ft. steel bridge be erected over the small stream in Fig Creek Twp. Address the Henry Co. Ck.

Simms, Mont.—Bids will be received until 2 p. m., July 24 by the Cmsr. of Cascade Co., at Great Falls, for constructing a steel bridge, 252 ft. long, across Sun River, at Simms, and four steel I-beam bridges. Lee Dennis is Co. Ck.

Burlington, N. J.—The contract for constructing a reinforced concrete bridge at Pearl St. has not been awarded. The work will be readvertised. Harry Hawkins, Jr., is Ck. Bd. Chosen Freeholders.

Ashland, O.—Bids will be received until July 24 for the furnishing of all labor and material necessary for the construction of the William Hoggle bridge. Address J. E. Gongwer, Ashland Co. Cmr.

Cleveland, O.—Bids will be received until Aug. 3 for the construction of bridge work, per report No. 2912 culvert, Euclid Heights Blvd., Cleveland Heights Twp., Report No. 2935 abutments, Canal Rd., over Tinkers Rd. Address John F. Goldenbogen, Ck.

Columbus, O.—Bids will be received until July 22 for the construction of the following: A 10-ft. brick sidewalk with concrete foundation, on High St.; an 8-ft. brick sidewalk on Eleventh Ave., with concrete foundation; also the construction of a macadam drive and brick walks from High St. to Oval St. Carl E. Steeb is Secy.

Delaware, O.—Bids will be received until July 29 for the superstructure of a bridge over Wakes Creek on the River Rd. The plans and specifications for this work will be on file in the office of W. H. Bodurtha, Delaware Co. Aud.

Middleburg, Pa.—Bids will be received until July 24 for the construction and erection of a reinforced concrete bridge across the Tuscarora Creek. Address Adam Shemory, Snyder Co. Cmr.

Providence, R. I.—Bids will be received by the State Bd. of Pub. Pds. at the State House, Providence, until noon July 24 for bridge construction in the following towns: Coventry, 18-ft. span; Exeter, 10-ft. span; Richmond, 15-ft. span; Foster, 15-ft. span and two 8-ft. spans; West Greenwich, 21-ft. span; Portsmouth, 10-ft. span.

Moncow, Tenn.—About \$10,000 will be expended for the construction of several steel bridges. Address the Fayette Co. Engr.

Paris, Tex.—The Lamar Co. Cmsr. will erect several steel bridges in connection with 40 miles of road. Address the Lamar Co. Ck.

Palmyra, Va.—Bids will be received until noon, July 29, by P. St. J. Wilson, State Highway Cmr., at Palmyra, for the construction of a bridge with a steel substructure over the Hardware River in Fluvanna Co., five miles from Scottsville on the C. & O. Ry. The structure will be 135 ft. 10 1/4 in. long, with a 12-ft. roadway. Plans and specifications may be seen at the office of the Clk. of the Circuit Court at Palmyra.

Centralia, Wash.—Two large steel bridges will be built in the eastern end of Lewis Co., one at Randle and the other at Bremer. The Randle bridge will be 250 ft. in length with a 700-ft. approach and the Bremer bridge will be 200 ft. in length with a 300-ft. approach. Address the Clk.

Calgary, Alta.—Bids will be received until July 31 for the construction of three reinforced concrete bridges, aggregating some 25 spans across the Bow and Elbow rivers. Plans and all information can be obtained from the office of the City Engr. in Calgary. Address J. M. Miller, City Clk.

Bids Received and Contracts Awarded.
Waterbury, Conn.—G. G. Riggs, of Waterbury, was awarded the contract to build the new iron girder bridge over Hancock Brook at Thomaston Ave. at a recent meeting of the Bd. of Works at \$8,597.74.

Columbus, O.—It is reported that the contract to construct a viaduct over Iuka Ave., on Summit St., has been awarded to John M. Hina, Columbus, at \$34,500.

Grove City, Pa.—The contract to construct the superstructure of the Lincoln Ave. bridge has been awarded to the Canton Bridge Co., Canton, O., at \$6,227. Bids were received by the Cmrs. of Mercer Co. at Mercer, June 25.

BONDS

Huntington Beach, Cal.—An election will be held on July 20 to decide the question of issuing \$160,000 bridge bonds. Address the City Clk.

Miami, Fla.—An election will be held to decide the question of issuing \$500,000 road improvement bonds. Address the Chmn. of the Bd. of Co. Cmrs.

Atlanta, Ga.—Bonds to the amount of \$2,000,000 will be issued for improving streets. Address C. S. Winn, Mayor.

Washington, Ga.—Bonds to the amount of \$30,000 have been voted for street improvements. Address the City Clk.

Oelwein, Ia.—Bonds to the amount of \$74,000 have been voted for paving purposes. Address the City Clk.

Ford River, Mich.—Bonds to the amount of \$3,500 have been voted for the construction of good roads. Address the City Clk.

Jackson, Miss.—Bids will be received until Aug 1 for the purchase of \$100,000 5% road bonds. Address W. W. Downing, Clerk of the Bd.

Moss Point, Miss.—Bonds to the amount of \$7,000 have been issued for street improvements. Address the City Clk.

Galeana, Mo.—Bonds to the amount of \$10,000 have been voted for the construction of good roads. Address the City Clk.

Statesville, N. C.—Bids will be received until July 22 for the purchase of \$150,000 5% 20 to 30 years county road improvement bonds. Address J. E. Boyd, Clk. of the Bd.

Lisbon, O.—Bids will be received at the office of the Cmrs. of Columbiana Co., Lisbon, until 1 p. m. July 29, for the purchase of county bonds to the amount of \$17,248.50. The proceeds will be used for road improvement.

McArthur, O.—Bonds to the amount of \$17,000 have been voted for the construction of the roadway in Main, Market and North Sts. Address the City Clk.

Toledo, O.—Bids will be received until Aug. 2 for the purchase of \$19,200 4 1/2% road improvement bonds. Address Chas. Sanzenbacher, City Aud.

Lookout Mountain, Tenn.—An election will be held soon to decide the question of issuing \$25,000 road bonds. Address R. M. Watkins, Mayor.

Atlanta, Tex.—Road bonds will be issued to the amount of \$35,000.

Marshall, Tex.—An ordinance has passed the City Council providing an issue of \$28,000 in bonds for street improvements. Address the City Clk.

San Angelo, Tex.—Bonds to the amount of \$70,000 have been voted for roads and bridges in Tom Green Co. Address the City Clk.

Smithville, Tex.—Bonds to the amount of \$100,000 will be advertised for sale soon, it is reported. The proceeds will be used for road improvement.

Waxahachie, Tex.—An election will be held on Aug. 10 to decide the question of issuing \$100,000 in bonds for the construction of good roads. Address the City Clk.

MISCELLANEOUS

Jacksonville, Fla.—A contract has been awarded to the Buffalo Steam Roller Co., Buffalo, for furnishing one 7-ton tandem road roller. G. L. Barnard is Duval Co. Engr.

NOTICE TO CONTRACTORS

TRUNK LINE STATE ROAD WORK.
Sealed proposals for building a section of state road 4.54 miles in length on the designated trunk line in the towns of York and Wells will be received by the state commissioner of highways at the State House, Augusta, Maine, until 3 o'clock P. M., Monday, July 29, 1912.

Alternate bids will be received for the construction of concrete and bituminous macadam.

Specifications, and blank forms of proposal will be furnished upon application and a full set of plans may be seen at the office of the State Highway Commissioner, Augusta, Maine, and at the Mousam House Kennebunk, Maine.

No proposal will be considered unless made on the regular form furnished by the state highway department.

Each bidder must accompany his bid with a certified check payable to P. L. Hardison, State Commissioner of Highways, for 10% of the amount of his bid. The successful bidder will be required to furnish a bond as provided by the state road law.

The right is reserved to reject any and all bids.

Proposals should be endorsed "York-Wells Trunk Line" and addressed to

P. L. HARDISON,
State Commissioner of Highways.
Augusta, Maine.

The HOTCHKISS System of Steel Sidewalk and Curb and Gutter Forms

Oldest concern in the market manufacturing Steel Forms of this kind. Worked out entirely on practical lines. Our Forms not the Cheapest, but the Best. Try a sample set at our risk. If they are not worth the difference in cost, RETURN AT OUR EXPENSE. IS THIS NOT FAIR?

How They Like Them in Canada After Paying 30% Duty

CITY ENGINEER'S OFFICE

Medicine Hat

Alberta, Canada, April 19, 1911.

Hotchkiss Lock Metal Form Co.,
Binghamton, N. Y.

Gentlemen:—Will you please ship as per your quotation of March 24th.

100 ft. Standard Curb and Gutter Forms.
300 ft. Sidewalk Forms.

Yours truly,

(Signed) A. W. GLEAVES, Storekeeper.

CITY ENGINEER'S OFFICE

Medicine Hat

Alberta, Canada, July 18, 1911.

Hotchkiss Lock Metal Form Co.,
Binghamton, N. Y.

Gentlemen:—Ship immediately one hundred and fifty feet Curb and Gutter Forms, same as supplied previously. Advise when we may expect delivery.

Yours truly,

(Signed) A. W. GLEAVES, Storekeeper.

CITY ENGINEER'S OFFICE

Medicine Hat

Alberta, Canada, March 8, 1912

Hotchkiss Lock Metal Form Co.,

Binghamton, N. Y.

Gentlemen:—Will you please ship as per your quotation of February 3rd, the following material:

250 ft. Curb and Gutter Forms.
40 Rigid Side-Rails, 10 ft.x5 in.
50 Division Plates, 6 ft.x5 in.
50 Dozen Keys.

Your prompt attention will oblige,

Yours truly,

(Signed) A. W. GLEAVES, Storekeeper.

WRITE FOR LATEST BOOKLETS

HOTCHKISS LOCK METAL FORM CO.
DEPARTMENT G
BINGHAMTON, N. Y.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 26,624 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the north city line of Altoona, station 374 + 99.6, to the Blair-Cambria County line, station 641 + 44, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Hollidaysburg, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$4,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 221 in Blair County, Logan Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,988 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: From the borough line of Edgeworth and extending in an easterly direction to the Backbone Road, near the property of the Allegheny Country Club, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Sewickley Heights Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 9,524 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the improved road at Warrendale, near Brush Creek, in a northerly direction to the Butler County line under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route 246 in Allegheny County, Marshall Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 12,104 lineal feet of asphaltic-macadam road, 14 feet wide, situated as follows: From station 1576 + 57.35, on Route 123, near the property of D. D. Schriver, and extending in a southeasterly direction to the cross roads beyond the village of Hunterstown, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at 54 Hartman Building, York, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Adams County, Straban Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 10,996 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From the Village of Woolrich, station 0 + 00, to Dunnstable township line, station 92 + 42; and from Pinecreek township line, station 99 + 82, to River Road at station 117 + 36 on Route No. 23, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton County, Pinecreek Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 740 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From Pinecreek township line at station 92 + 42, to Pinecreek township line at station 99 + 82, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut St., Philadelphia; 2117 Farmers' Bank Building, Pittsburgh; and at Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton Co., Dunnstable Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 3,510 lineal feet of brick block pavement, 16 feet wide, situated as follows: From 5th Ave. extension to State St., on Pennsylvania Ave., under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed

in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Versailles Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,833 lineal feet of brick block pavement, 16 feet wide, situated as follows: From the east line of Albion borough and connecting with the State Highway in Conneaut Township, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Erie County, Albion Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 8,077 lineal feet of brick block pavement, 14 feet wide, situated as follows: From end of present improved road, station 1412 + 33, near the property of George Runyon, and extending in a northwesterly direction through Conneaut Township to station 1493 + 10, near the property of George Kenidy, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 85 in Erie County, Conneaut Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 7,400 lineal feet of telford-macadam road, 16 feet wide, situated as follows: From the property of E. S. Case through the village of Shirksville to the property of Reuben Young, station 74 + 00, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Lebanon County, Bethel Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.

COMMONWEALTH OF PENNSYLVANIA.
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department

in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 1,790 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Beginning at the Woodland Road and extending in an easterly direction to the township line of Sewickley Heights, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Edgeworth Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, JULY 27, 1912

Number
4

The Proposed Ohio Bond Issue

Much activity is in evidence throughout Ohio on the part of the members of the Ohio Good Roads Federation and others interested in the betterment of roads throughout the state in working for the carrying of the \$50,000,000 bond issue, which will be decided by a vote of the people at a special election, Sept. 3. The question to be decided is involved in Section 1 of Article 8, as named by the Ohio Constitutional Convention, which reads as follows:

"The State may contract debts to supply casual deficits of failures in revenues, or to meet expenses not otherwise provided for; but the aggregate amount of such debts, shall be applied for the purpose for which it was obtained, or to repay the debts so contracted, and to no other purpose whatever: Provided, however, that laws may be passed to contract debts and authorized issues of bonds to an amount which in the aggregate of all issues shall not exceed fifty million dollars for the purpose of constructing, rebuilding, improving and repairing a system of inter-county wagon roads throughout the state. Not to exceed ten million dollars of such bonds shall be issued in one year, and there shall be added and collected annually by taxation an amount sufficient to pay the interest on said bonds and to provide a sinking fund for their redemption at maturity, and laws shall be passed to provide for the maintenance of said roads. Such wagon roads shall be determined under general laws and cost of constructing, rebuilding, improving, repairing and maintaining the same shall be paid by the state. The provisions of this section shall not be limited or controlled by Section six of Article 12."

The apportionments of the tax that will be borne by the different classes of property throughout the state, if the amendment carries, based upon paving statistics given by the Ohio State Tax Commission, are estimated to be as follows: Real estate in cities and villages, value, \$2,544,547,115, 41 per cent.; farm lands, value, \$1,676,590,965, 27.1 per cent.; public utilities, value, \$912,862,833, 14.7 per cent.; banks, value, \$174,693,439, 2.8 per cent.; personal property, value, \$891,437,728, 14.4 per cent.; average per capita cost per year to the people of Ohio, 53 cents. The average annual tax necessary to be paid by persons owning property assessed at \$1,000 will be as follows: For the first ten years, 26½ cts.; for the next 15 years, 43 cts. The cost for the past ten years has been 20 cts.

Good Roads Meeting at Independence, Kansas

A good roads meeting at which representatives of five counties of Kansas were present was held recently at Independence and an inter-county good roads association organized to lay out a proposed highway from Winfield, through Montgomery County to Kansas City.

It was explained at the meeting that several of the counties interested have stretches of road that need only connecting to make them a continuous highway. The worst gap in line is in Montgomery County, and only a few weeks will elapse before the county commissioners make a tax levy for 1913. One of the principal objects of the meet-

ing was to bring pressure to bear upon the commissioners to comply with the new Kansas road laws and designate the county roads. Then the cities can be taxed to help build them, whereas now all the money must be raised by the townships. The levy must be made by August 1, and unless the roads are classified by that time the county will be without road money for another year.

A suggestion was made by H. G. James, chairman of the meeting, that the first county road be a continuation of the 28 miles of Chataqua road northeast to Moorehead. The road as outlined in detail leads from Winfield to Cedarvale, thence through Sedan, Independence, Cherryvale, Thayer, Chanute, Humbolt, Iole, Garnett, Ottawa and Olathe to Kansas City. At Independence the road will intersect one running from Caney south through Oklahoma.

A permanent organization was formed and named "The Oil Belt Route Association." H. W. Loy, of Chanute, was elected president, and Herb Cavaness, of Chanute, was made secretary.

Washington, D. C., to Have Portable Municipal Asphalt Plant

The District Commissioners of the District of Columbia have approved the recommendation of Capt. Mark Brooke, Assistant Engineer Commissioner, that he and Inspector E. F. McCormick be authorized to go to Cleveland, O., in connection with the purchase of a portable municipal asphalt plant, for use in the District for which Congress has appropriated \$7,500. Cleveland operates not only a municipal asphalt plant, but a portable plant which is used in street repair work.

It is said that the acquisition by the District of a portable plant is the first step toward the establishment of a government owned institution, which will do the work of repairing the streets of the District of Columbia, now performed under contract.

The commissioners are convinced from the investigations made by Engineer Commissioner Judson that a considerable annual saving will be effected by this method and their last estimate to Congress included an item of \$80,000 for the establishment of a plant.

The appropriation was not made by Congress, but in the appropriations for the district an item was included authorizing the expenditure of \$5,000 for the investigation of the desirability and cost of establishing such a plant, and \$7,500 for a portable plant to be used exclusively in street repair work.

Captain Brooke and Inspector McCormick will visit Cleveland about August 1, and it is expected that the portable plant will be in operation in the District about September 1.

Borough President Connolly, of the Borough of Queens, New York City, has been granted by the Board of Estimate, two chemists at \$1,200 a year each and ten assistant engineers to supervise the building of \$3,000,000 worth of bituminous roads in Queens County, including the \$2,000,000 worth for which the city pays 85 per cent. and a large amount to be paid for by assessment. The chemists will be employed in inspecting materials at the asphalt plants.

Proposed New Road Tax Law in Minnesota

In an address at a recent meeting of the Association of Commerce of St. Paul, Minn., Senator J. T. Elwell, of Minneapolis, Minn., who drew up and introduced the so-called Elwell road law, now in effect in Minnesota, outlined the proposed one-mill road tax amendment to the law, which will be voted upon by the people of the state at the coming election.

Senator Elwell gave a general outline of the working of the present road laws, both the one which applies to Minneapolis, permitting the spreading of assessments over a period of 15 years, and the state law, which provides that the state shall pay one-half, the county one-quarter and the people benefited, one-quarter of the tax for building state roads.

After explaining at length the advantages of the state law, under which the city of Minneapolis was making improvements on Central Ave., which will eventually connect with Minneapolis Ave., and extend through the state fair grounds, Como and into the city of St. Paul, Mr. Elwell was informed by City Engineer Claussen, of St. Paul, who was present, that St. Paul was already operating under a somewhat similar method and that there was little need of adopting any new system of spreading assessments in that city.

In explaining the general law, which applies to all counties, Senator Elwell showed how the cities of St. Paul and Minneapolis would greatly benefit by arterial roads, from the northern districts of the state. He said that although Ramsey, Hennepin and St. Louis Counties were assessed about 60 per cent. of the total cost of improving the state roads, neither of these counties could use more than 3 per cent. of the entire fund in any one year for improvements, and declared that fixing the limit of expenditures at this amount in the larger counties would stimulate less populous counties to improve their roads. He stated that Blue Earth County secured a large amount of state road construction last year because the officials of that county showed a desire to construct good roads. He explained that under the present method of paying assessments, Ramsey County could use \$200,000 this year for road construction, but could not use any more for ten years, as that comprised the total amount to which it was entitled for that period.

Mr. Elwell explained that under the present system the people of the remote counties must be treated with consideration, as their objections to any road improvement would seriously affect the construction of trunk lines, and for this reason the limit of 3 per cent. of the entire fund was placed on all counties.

If the proposed one-mill tax is carried, Minnesota will have a fund of approximately \$27,000,000 with which to build roads.

At present the state with the co-operation of the counties is building a 400-mile road between St. Vincent and Duluth; a road from Moorehead eastward across the state to Duluth, a distance of 260 miles; a road from International Falls to the heart of the city of St. Paul and a road from Duluth to the twin cities.

Mr. Elwell said that the net result of the good roads movement would be to make the twin cities the center of a network of arterial roads extending to all parts of the state.

The projected improvement includes the erection of a modern concrete bridge at the foot of Light St., the construction of a water-front street to protect the development of the harbor and an auxiliary street to remove the congestion of traffic and to furnish a direct trackless street to the heart of the city.

In the report of the Commission, which is signed by Calvin M. Hendrick, Chairman pro tempore, recommendations are made relative to the erection of a concrete bridge to replace the antiquated Long Bridge at Spring Gardens and to the extension of the harbor front street. In addition, the following suggestions are made: That Macomb St. be extended from Light St. to the intersection of Allen St. to give an easy grade and direct outlet from the harbor to the proposed concrete bridge to Anne Arundel and Baltimore counties; that a broad water front street be constructed starting at Swan Park Reservation and skirting the water front from the intersection of Light St. on the northwest corner of the proposed park to the intersection of the contemplated concrete bridge; that Swan Park Reservation be sold and that the point of land extending from the intersection of Light St. and Long Bridge back to the intersection of the proposed water front street and Light St. be condemned for park purposes, thereby effecting control of the approach to the bridge and securing the development of the approach.

Syracuse Paving Case Carried to Higher Court

A suit over the paving of Marcellus St., between South West and South Geddes Streets, in Syracuse, N. Y., which started about three years ago, has been carried to the Court of Appeals. Important questions as to the powers of the Board of Contract and Supply are involved.

The improvement was opposed by a number of the property owners who differed as to the material to be used, but finally agreed and filed a designation. Bids were submitted several times and rejected and new bids advertised for. The bids were for about \$40,000 and were rejected by the Board as excessive in amount. In the trial court it was decided that the property owners having made their designation the board had lost control. The Appellate Court reversed the decision of the trial court and ruled that the board had not lost jurisdiction and could reject bids until the contract was awarded.

It is said that it will be six months before the Court of Appeals will decide the case and the pavement can not be laid until next year at the earliest.

To Tax Funerals to Improve Roads

It is stated that President Maurice Connolly, of the Borough of Queens, New York City, has prepared an ordinance providing for a tax of \$1 on every funeral cortege which passes through the borough, for the purpose of establishing a fund for maintaining the roads of the borough.

The proposed tax would be a revival of a former ordinance covering nearly the same ground. Practically all the convenient routes which lead to the several cemeteries in which the dead of New York are buried lie in the Borough of Queens. The income which would be derived from such a source is estimated to amount to about \$100,000 annually.

Plan New Streets in Baltimore, Md.

The Commission on City Plan of Baltimore has filed an exhaustive report containing recommendations for a system of new streets which will open up the heart of the Baltimore business district to the produce growers of Anne Arundel and Baltimore Counties.

Since the Elwell state road law in Minnesota has been declared constitutional, the State Highway Commission has been requested to build 19 state highways at a cost of \$2,000,000. The longest proposed road is from Duluth to St. Vincent, 350 miles, which it is estimated will cost \$1,500 a mile.

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New Series
Vol. IV., No. 4

JULY 27, 1912.

Convicts to Build Turnpikes

The Board of County Commissioners of Shelby County, Tenn., is contemplating the use of workhouse convicts in the building and maintaining of turnpikes. Heretofore the work of convicts on the county roads has been practically confined to the construction of dirt roads. Many of the turnpikes of the county are worn out and are not much better than dirt roads. They are good in dry weather, but during the rainy season and in the winter they become full of mud holes.

The commissioners have to confront the problem of how to provide funds for much-needed repair. The accounts of the turnpike department are overdrawn for over a year to come and the solution seems to lie in working the convicts. The board proposes to let practically no labor by contract. Convict labor and such labor as it may be found necessary to hire will be employed, according to present plans, and will be under the direct supervision of the board. This will apply to the hauling and spreading of the gravel and also the digging of the gravel where suitable and where properly located pits can be secured. The building of culverts and the laying of drains will also be under the direct supervision of the board without contract letting.

It is proposed to build concrete culverts where the openings required are more than 48 ins. in width. For smaller openings terra cotta or metal pipe will be used. The engineer in charge of this and the drainage work will be F. A. Mote, who has recently been engaged by the commissioners. Openings of 18 ft. or more come under the supervision of the Superintendent of Bridges, to which position Justice F. S. Knight was recently elected by the County Court.

New York Automobile Shows

At its quarterly gathering in New York City, July 11, the Automobile Board of Trade discussed the report of the show committee on the tentative plans for the exposition to be held in the New Grand Central Palace and Madison Square Garden, January 11 to 25.

The exposition of pleasure cars will be held in both buildings from the 11th to the 18th. The commercial vehicle division will also be held in both buildings, opening on Monday, January 20 and closing January 25.

Proposed New Road in Colorado

Chief Engineer Mahoney and Secretary Allen, of the Colorado State Highway Commission, are making surveys and an investigation of the probable cost of building a wagon road from Grand Junction through the Unaweep Canon to Paradox thence to Montrose via Pinon. The road will be 90 miles long.

The officials are going over the road to determine what is needed to put it in first-class condition when state money shall become available. When this will be is indefinite, other than it is positively known that no funds for road improvement and road construction in Colorado will come into the control of the Highway Commission until after the Legislature provides it, or unless the good roads bill to be initiated at the fall election is carried.

To Discuss Sand-Clay Roads

One of the important subjects to come before the convention of the North Carolina Good Roads Association, which will be held in Charlotte, August 1, will be sand-clay roads. This subject is to be discussed and treated in detail.

The construction and value of roads of this type will be explained by engineers who built them in all parts of the country, and there will be opportunities for delegates to inspect some of the good examples of sand-clay roads in Mecklenburg County.

It is said that inquiries regarding this method of construction are coming in from county officials and others interested throughout the state.

Good Roads Meeting in West Virginia

The citizens of four Virginia counties, Ohio, Wetzel, Marshall and Greene, have united their efforts in a campaign to secure aid, both federal and state, in building roads in that section.

A mass meeting will be held August 7 in Phillips Grove near Cameron. A committee of three has been appointed from the Moundsville Automobile Club to confer with a committee of four from the Ohio Valley Auto Club of Wheeling in the interests of the meeting.

Cincinnati Leases Canal for Boulevard

Mayor Hunt and City Solicitor Bettman, of Cincinnati, O., have accepted from the state a lease of the Miami and Erie canal land extending from Mitchell avenue to Broadway in Cincinnati. The lease is for 99 years, renewable forever.

The city is to pay the annual rental of \$32,000, 4 per cent. on the valuation of \$800,000 placed on the land by a commission appointed by Governor Harmon.

Under the terms of the lease the city may use the land for a street or boulevard, and construct a subway underneath it if desired. The city is prohibited from subleasing the land to any public utility.

The Selma-Meridian Highway Association was organized at a recent meeting held in Demopolis, Ala. Delegates were in attendance from Meridian, Uniontown, Faunsdale, Selma and Demopolis. The following officers were elected: President, D. P. Coleman, Uniontown; Treasurer, Siddons Stollenwerck, Faunsdale; Secretary, Morgan Richards, Selma. The meeting was held at the instigation of the Selma Chamber of Commerce in the interests of a proposed road from Selma to the Mississippi city. A committee was appointed to map out the route of the proposed road and a scouting party will go over it.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. J. E. Pennybacker, Secretary, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

General News

Extensive street improvements are to be made throughout the District of Columbia. The plans adopted by the Engineer Department call for asphalt block, sheet asphalt and macadam.

What is claimed to be the longest stretch of concrete pavement in Missouri has just been completed. It comprises a section of 74th St. from Broadway to the state line in Westmoreland.

It is expected that work on the construction of the steel bridge to be built across the Ohio River at Metropolis, Ill., will begin not later than August 1. The estimated cost of the bridge is \$4,500,000.

Commissioner of Public Works Simmons of Milwaukee, Wis., has recommended the use of granite, sandstone, brick or creosoted blocks for all paving on streets in which there are car tracks.

Preliminary survey work has been started on the highway which will be built between Ft. Worth and Kellar, Texas. This road is being built with the proceeds of the recent \$1,600,000 bond issue authorized at a special election in Tarrant County.

As a result of three suits which have been instituted against the city of Elkhart, Ind., to enjoin the work of paving five of the city's streets, it is stated that there will probably be no more street improvements made in the city this year.

According to a statement issued by the Texas Commercial Secretaries and Business Men's Association, 135 counties in Texas were engaged in improving and building public highways during June. The recent rain in all sections of the state rendered some of the roads impassable, and the use of the road drag has become extensive during the past 30 days. One hundred and seven counties reported that they used the drag successfully during June.

At a special election held recently in Greenville, Pa., the proposition of a bond issue for \$100,000 for additional paving was carried.

An open air meeting was held recently in St. Joseph, Mo., near Singleton Lake, the object being to work up sentiment in favor of the proposed \$1,000,000 bond issue for good roads, on which there will be a special election Aug. 10. The meeting was largely attended. Information regarding this bond issue and the use the money will be put to was disseminated by the Commerce Club, which is backing the campaign. Speeches on good roads were made by C. C. Crow, L. M. Stalard and K. B. Randolph.

The Marshall County Good Roads Association of West Virginia recently held a meeting in the County Court house. A motion was carried at the meeting directing that a committee be appointed to cooperate with a like committee of the Ohio Valley Automobile Association of Wheeling, W. Va., to inaugurate a movement to secure an improved highway from Marshall County to Fairmont. The committee is composed of the following: A. H. Gray, Dennis Williams, R. G. Dakan, R. J. Smith, E. G. Gorby, S. C. Shaw and W. F. Crow.

Plans have been completed by the Park Board of East St. Louis, Ill., for the construction of a park boulevard, which will be two miles long and cost about \$114,971. The proposed boulevard runs from Caseville Ave., in Lansdowne, along 13th St. to the lake at Lansdowne Park. It will follow the side of the lake to Monroe Ave., where it will turn off to King's Highway in Washington Park. The plans call for a 35-ft roadway, paved with asphalt. A meeting will be held before the St. Clair County Court at which any objection to assessments levied by the Park Board against property owners affected by the proposed improvement will be heard.

Personal Notes

Edmund B. Ulrich has been reelected city engineer of Reading, Pa.

L. B. Balch, for several years street supervisor of Ogden, Utah, was fatally injured in a runaway accident July 13.

Frank W. Solon, who has been acting commissioner of streets of Chicago, Ill., for some time, has been appointed permanently to the position.

H. K. Faust, who has been connected with the Department of the Commissioners for Opening Streets in Baltimore, Md., for about four years, has

been appointed engineer of the department, succeeding William G. Surco, who was recently appointed Roads Engineer of Baltimore County.

State Highway Commissioner James H. MacDonald of Connecticut has appointed George E. Cox of Hartford Inspector of Highways at a salary of \$100 a month. The appointment was made to carry out the law passed in the last General Assembly, calling upon the highway commissioner to compel public service corporations using the state highways to leave them in as good condition as they were before they used them.

Trade Notes

An attractive folder in three colors entitled "Wise Men and the Star They Followed" has been issued by the Texas Co. of New York. Its pages are principally devoted to testimonials from users of Texas oils.

The Asphalt Products Co., Cleveland, O., has been incorporated for the purpose of manufacturing and dealing in oils, paints, varnishes and asphalt. The capital stock is \$10,000. Sidney N. Weitz, Mary B. Grossman, H. C. Cummings, Harry Pott and Alvin L. Bohemer are the incorporators.

The Trautwine Company, 257 S. 4th St., Philadelphia, Pa., has published a second issue of the nineteenth edition of the "Civil Engineer's Pocket Book," which is now ready for distribution. This issue contains over 1,300 pages, and it is sold for the same price, \$5.00, as when it was first issued in 1871, when it contained 645 pages.

The Bates Tractor Co., of Lansing, Mich., the manufacturers of the "Bates All-Steel Tractor," which was designed especially for farm use, announces in a recent circular that it has now adapted this tractor to road building. The manufacturers claim that this tractor can be driven wherever horse can travel, on soft ground or rolling land, and will not pack the soil as much as horses.

A 22-page booklet has been issued by Walter Cressy of Gloucester, Mass., describing the Pillsbury sprayer and its uses. The various parts of the machine are described at length, and several illustrations showing views of it from different angles are used effectively. Views of roads and streets which have been sprayed with the Pillsbury machine are also shown. Letters of recommendation from several officials and contractors are interpolated.

CONTRACT NEWS

ROADS AND STREETS

Contracts Pending

Date of letting.	Reported in issue of	
7-27 Elmwood Place, O., st. imp.	7-27	
7-27 Zanesville, O., grading and paving	7-20	
7-27 Cleveland, O., paving	7-13	
7-27 Richmond, Va., gravel rd.	7-27	
7-29 Augusta, Me., rd. const.	7-13	
7-29 Newark, O., paving	7-13	
7-29 Lisbon, O., rd. bonds	7-20	
7-29 Morristown, N. J., macadam rd.	7-20	
7-29 Opelika, Ala., rd. work	7-27	
7-29 Perry, Ia., street imp.	7-27	
7-29 Tamaqua, Penn., paving	7-27	
7-30 Palmesville, O., paving, etc.	7-27	
7-30 North Toronto, O., paving	7-13	
7-30 Harrisburg, Pa., rd. work	7-13	
7-30 Decatur, Ala., curbs, sidewalks, etc.	7-27	
7-30 Chicago, Ill., grading and paving	7-27	
7-30 Jeffersonville, Ky., street imp.	7-27	
7-31 Xenia, O., paving	7-20	
7-31 Providence, R. I., highway	7-20	
7-31 Lancaster, O., road imp.	7-20	
7-31 Steubenville, O., grading, macadam	7-27	
8-1 Walla Walla, Wash., paving	7-13	
8-1 Jackson, Miss., rd. bonds	7-20	
8-1 Little Rock, Ark., gutters and earth work	7-27	
8-1 Fort Myers, Fla., macadam rd.	7-27	
8-2 Toledo, O., rd. imp.	7-20	
8-2 St. Louis, Mo., street imp.	7-27	
8-2 Hackensack, N. J., asph. mac. pavt.	7-27	
8-2 Cleveland, O., street paving	7-27	
8-2 Lisbon, O., grading, brick paving	7-27	
8-3 Racine, Wis., shore protection	7-27	
8-3 Atchison, Kan., rd. imp.	7-20	
8-3 S. Bethlehem, Pa., street paving	7-27	
8-3 Orange, N. J., street work	7-27	
8-3 Hernando, Miss., grading	7-27	
8-3 Lorain, O., rd. work	7-27	
8-3 Oaklyn, N. J., rd. imp.	7-20	
8-3 Bass, Ala., rd. work	7-27	
8-3 Scottsboro, Ala., rd. work	7-27	
8-3 Macon, Miss., rd. const.	7-27	
8-3 Greenville, Ala., rd. work	7-27	
8-3 Upper Sandusky, O., rd. const.	7-27	
8-10 Racine, Wis., grading, street wk.	7-27	
8-12 Marion, Ala., rd. work	7-27	
8-12 Lisbon, O., rd. work	7-27	
8-12 Rockford, Ala., rd. work	7-27	
8-12 Livingston, Ala., rd. work	7-27	
8-14 Cleveland, O., rd. const.	7-27	
8-15 Sandusky, O., rd. bonds	7-27	
9-12 Shreveport, La., rd. const.	7-27	

BRIDGES.

7-29 Delaware, O., bridge	7-20
7-29 Palmyra, Va., bridge	7-20
7-30 Weedport, N. Y., substrc. and approach	7-27
7-31 Calgary, Alta., bridge	7-20
8-1 Batesville, Miss., concrete bridge	7-20
8-1 Pittsburg, Pa., concrete bridge	7-27
8-3 Richmond, Va., bridge constr.	7-27
8-3 Cleveland, O., bridge work	7-20
8-6 Tampa, Fla., bridge	7-20
8-6 Raymond, Miss., bridge and rd. work	7-27
8-6 Tampa, Fla., concrete work	7-27
8-7 Cartersville, Ga., bridge constr.	7-27
8-7 Indiana, Pa., reinf. conc. bridge	7-27
8-8 Marion, Kan., reinf. conc. bridges	7-27
8-10 Port Huron, Mich., bridge	7-20
8-9 Cincinnati, O., bridges and culverts	7-27
8-12 Searle, Ala., concrete bridge	7-27
8-12 Lawrenceburg, Ind., bridge const.	7-27
8-16 Cincinnati, O., concrete bridge	7-27
9-4 Tallulah, La., bridge	7-27

ROADS AND STREETS

Bids Asked and Prospective Work

Decatur, Ala.—Sealed bids will be received by the Mayor and Council of Decatur at the Mayor's office until 8 p. m. July 30 for the construction of certain cement sidewalks, brick cross walks and cement curbs. Plans and specifications are on file in the office of the City Engr. Address H. A. Skeggs, Mayor.

Bids will be received until 8 p. m. July 30 for the construction of certain asphalt macadam pavement and cement gutters. Plans and specifications on file in the office of the City Engr.

Greenville, Ala.—Bids will be received by the Court of Co. Comrs. of Butler Co. at the Court House, Greenville, at 10 a. m., August 7, 1912, for grading and surfacing with sand-clay approximately twelve (12) miles of State Aid Road. Amount to be expended, \$17,000. Profile and specifications on file with the Probate

Judge at Greenville. W. S. Keller is State Highway Engr.

Livingston, Ala.—Bids will be received by the Court of Co. Comrs. of Sumter Co. at the Court House at Livingston, Ala., until noon, August 13, 1912, for grading and surfacing with chert approximately 3½ miles of state aid road. Amount to be expended, \$8,000.

Marion, Ala.—Bids will be received by the Court of Co. Comrs. of Perry Co. at the Court House at Marion, until 2 o'clock p. m. August 12, 1912, for clearing and grubbing, grading, draining and surfacing with gravel approximately four and one-half miles of the Uniontown end of the Marion-Uniontown Road.

Opelika, Ala.—Bids will be received by the Court of Co. Comrs. of Lee Co., at the Court House at Opelika, Ala., until noon, July 29, 1912 for grading and surfacing with top soil approximately six (6) miles of the Opelika and Beulah Road. Amount to be expended \$8,000. The right to omit a portion or the whole of the surfacing with top soil is reserved.

Rockford, Ala.—Bids will be received by the Court of Co. Co. Comrs. of Coosa Co. at the Court House, Rockford, Ala., until 2 p. m., August 12, 1912, for grading and surfacing with top soil approximately 6 miles of road. Amount to be expended, \$8,000.

Scottsboro, Ala.—Bids will be received by the Court of Co. Comrs. of Jackson Co. until 12 o'clock noon August 6, 1912, at Bass on the Talley Pike, near Stevenson, Ala., for grading, draining and macadamizing part of the Crow Creek Road, beginning at W. J. Talley's. Expenditure on State Aid, \$4,000. At the same time the county will let the rest of this road to the Tennessee State line, expenditures about \$14,000.

Talladega, Ala.—The Chamber of Commerce has recommended that the public square be paved, one-half at the expense of the property owners and one-half at the expense of the city.

Little Rock, Ark.—Sealed bids will be received by the Commissioners of Street Improvement, District No. 200, at the office of Lund & Hill, 201½ West 2d St., Little Rock, until noon, August 1, for grading approximately 17,500 cubic yds. of earth work and 14,300 ft. of cobblestone or other gutter and other work according to plans and specifications on file with the Chairman of the Commissioners at the office of Lund & Hill.

Coronado, Cal.—Eighty thousand dollars will be expended paving many streets throughout the city. Address City Clk.

Wilmington, Del.—The Levy Court of Newcastle Co. has decided to authorize State Highway Commissioner Price to advertise for bids for constructing roads from Yorklyn to Ashland and from Mendenhall Mills to Limestone road and a road in Blackbird connecting with the state road.

Fort Myers, Fla.—Sealed proposals will be received by H. E. Heitman, Fort Myers, until noon, August 1, 1912, for the clearing, grading and construction of ten miles of water-bound macadam road between Whiskey Creek and Punta Rossa, Lee Co. The work will consist approximately of sixty acres of clearing, 50,000 cu. yds. of earth excavation, 185 cu. yds. of concrete culvert work and 420 ft. of vitrified pipe. Profiles and specifications may be had on application.

Sanford, Fla.—The City Council is planning to expend \$200,000 to construct 22 miles of brick roads. Address City Clk.

Bloomington, Ill.—Arrangements are being made by the city authorities to let the contract for the Center St. paving and it is probable that this improvement will be made during the summer months.

Chicago, Ill.—Bids will be received July 30 for the construction of sewers, Portland cement concrete, grading and paving certain streets throughout the city. Address Edward J. Glackin, Secy., Bd. of Pub. Wks.

Dixon, Ill.—The City Council has passed local improvement ordinance No. 132, which provides for the macadamizing of North Ottawa Ave. from Boyd St. to the city limits, and two blocks on McKinney St.

Monmouth, Ill.—The Bd. of Loc. Imps. has established by resolution paving and assessment District No. 66, consisting of

South D St. from West Broadway to West Fourth Ave., West First Ave. and West Second Ave.

Peoria, Ill.—Sealed bids will be received by the County Court of Peoria Co. at Peoria for paving Spring St. with brick between Adams St. and Perry Ave.

Brazil, Ind.—Meridian St. will have new walks. Plans and specifications for the construction of new 5-ft. cement sidewalks on both sides of Meridian St. to the north city limits will be prepared at once.

Carlisle, Ind.—The City Council has directed a survey to be made for paving certain streets. Address City Clk.

Elkhart, Ind.—A petition for the paving of Jauriet St. with brick, bearing the signatures of three adjoining property holders, has been presented to the Bd. of Wks.

Des Moines, Ia.—The City Council has passed a resolution that it is deemed advisable and necessary to make improvements by paving with sheet asphalt, etc., 37th and Pleasant Sts.

The City Council has ordered the paving of Ascension St., Sixth Ave. and Fourth St.

Perry, Ia.—Sealed proposals will be received by the City Clk. of Perry at his office until 8 p. m. July 29 for the following street improvements: Paving Otley Ave. from 2d St. to 12th St. and constructing curbing from a point 300 ft. east of the east line of 10th St. to the west line of 12th St. Said paving shall be constructed from one of the following materials: 6-in. Portland cement; concrete with asphalt or bituminous dressing, consisting of Portland cement concrete base of six inches in thickness with one-eighth inch of dressing; bitulithic consisting of 2 in. wearing surface on a Portland cement concrete base; asphaltic or bituminous macadam with a 2-in. wearing surface on a concrete base; asphalt consisting of a 4-in. concrete base with 3 ins. of asphalt dressing. Estimated quantities, 13,000 sq. yds.

Hutchinson, Kan.—An ordinance has been passed by the City Council providing for the curbing of 17th St. West.

Jeffersonville, Ky.—Bids will be received July 30 until 9 o'clock a. m. by City Clerk Ernest W. Rauth for the improvement of Front St. from Watt St. to Missouri Ave.

Shreveport, La.—Sealed bids will be received until Sept. 12 by J. T. Bullin, Co. Engr. of Caddo Parish, for constructing a hard surfaced permanent roadway leading south from Shreveport along Red River by Hart's Ferry, a distance of about 5 miles.

Westbrook, Me.—The City Council has passed an ordinance appropriating \$30,000 for paving Main St.

Baltimore, Md.—The Paving Comn. has approved plans for the improvement of a number of streets in addition to those already under contract.

St. Paul, Minn.—Bids will soon be asked for the paving of Snelling Ave. from University Ave. to the Great Northern right of way, about 300 ft. north of Taylor St. The material used will probably be creosoted block. Estimated cost, about \$50,000. Address Chairman, Bd. of Pub. Wks.

The Bd. of Pub. Wks. has voted to make a favorable report on the order for repaving E. 6th St., from Sibley to Rosabel St., two blocks.

Red Wing, Minn.—The City Council is considering ways and means to pave Osceola Ave. from Pleasant Ave. to Milton St. Address City Clk.

Hernando, Miss.—De Soto Co. will let at Hernando, first Monday in August, about one hundred thousand dollars of grading. Address R. C. Clifton, Co. Clk., Hernando Miss.

Macon, Miss.—Sealed proposals will be received by the Road Comrs. of District Three, Noxubee Co., at their office in the Court House at Macon, Miss., until 2 p. m., Aug. 7, 1912, for the building of approximately 24½ miles of sand-clay road in said District Three. The work will include approximately 38,000 yards of earth excavation and the hauling, placing and spreading of the sand-clay required for surfacing these roads.

Kansas City, Mo.—The City Council has ordered that 24th St. be paved between Metropolitan Ave. and Ruby Ave.

St. Joseph, Mo.—The Bd. of Pub. Wks. has recommended an ordinance for paving Sacramento St. between 28th and 36th Sts. with mineral rubber asphalt.

A petition to pave 29th St., Jule to Sylvania St., with Eclipse concrete has been presented to the Bd. of Pub. Wks.

St. Louis, Mo.—Sealed proposals will be received until Aug. 2 for improving Beeethoven Ave., St. Louis Ave., Alabama Ave., Roosevelt Pl., Tennessee Ave., Bell Ave., De Soto Ave. and for reconstructing Benton St. Wm. T. Findly, Sec. of Bd. of Pub. Wks.

Omaha, Neb.—The City Council has decided to pave Mason St. between 22d and 24th Sts. with asphalt.

Hackensack, N. J.—Sealed proposals will be received by the Co. Rd. Committee of the Board of Chosen Freeholders of Bergen Co. at the office of the Clk. of the Bd. in the Court House, Hackensack, until 2 p. m. Aug. 3 for the improving with asphalt macadam pavement of the road known as Cedar Lane, Teaneck Road and Forest Ave., in the Twp. of Teaneck, beginning at the easterly end of the Anderson St. bridge over the Hackensack River and extending thence in an easterly direction 2.76 miles to a point on the dividing line between the City of Englewood and the Twp. of Teaneck, County of Bergen.

Plans, cross-sections and specifications can be examined and all necessary information obtained at the office of the Clk. of the Bd. of Freeholders, Court House, Hackensack, N. J., or at the office of the Co. Engineer, Court House, Hackensack, N. J., any day except Saturday between the hours of 10 a. m. and 4 p. m.

Orange, N. J.—Sealed proposals will be received by the City Clk. in the council chamber, Canfield St. engine house, until 3 p. m., August 5, for the following street work: Flagging and reflagging, curbing and recurbing, paving and repaving the sidewalks and gutters of Dodd St. from Washington St. to the East Orange line, with certain stated exceptions; flagging the sidewalks of Tremont Ave. from Lincoln Ave. to the West Orange line. Address Owen C. Dolan, Chairman of the Committee on Streets.

Buffalo, N. Y.—Sealed proposals will be received by the Park Comrs. of Buffalo at their office, No. 13 City Hall, for paving the southeasterly roadway of Bidwell Parkway with macadam, asphalt or bituminous macadam pavement according to plans and specifications on file in the office of the Park Comrs.

Cincinnati, O.—Resolutions have been passed by the City Council authorizing the following improvements: Paving Spring St. from Reading Road to E. 12th St.; Denver Ave. (formerly Neff Ave.) from Wilder Ave. to Maxwell Pl.; paving with granite block pavement Court St. from Sycamore St. to Broadway; paving with stone block pavement Exeter St. from Western Ave. to MacLean Ave.; paving with brick Sauer Ave. between Warner St. and a point 200 ft. south of Parker St.; paving with stone block pavement Colerain Ave. from Bank St. to Harrison Ave.; grading and constructing the necessary drains and inlets on Liberty St. from a point 120 ft. west of the west curb line of Manss Ave. to the curb line of Rosemount Ave.; grading and paving Knox St. between Thompson Ave. and Saturn St.; grading, paving, etc., on Innes Ave. between Bruce and Frederick Aves.; paving with granite block the pavement of Neave St. between West 6th St. and Staebler St.

Cleveland, O.—Sealed proposals will be received until Aug. 2 for improving Round Bottom Road from Batavia pike to within 1,200 ft. of Hamilton Co. line in Anderson township. Albert Reinhardt, Clerk.

Sealed proposals will be received at the office of the Commissioners of Cuyahoga Co., at Cleveland, until 10 A. M. August 14, 1912, for grading and paving with brick for heavy traffic the No. 7 Improvement State Road, State Highway "E" pet. No. 634 in Brooklyn and Parma Twp.; length, 15,516 ft., or 2.94 miles, width of pavement, 14 ft. Estimated cost of construction, \$73,497.40. Plans and specifications are on file in the office of the County Commissioners and the State Highway Dept., Columbus.

An ordinance has been passed determining to proceed with the improvement of Niessen Court S. W. from W. 44th St. to W. 46th St. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of W. 79th St. from Lorain Ave. to Hope Ave. S. W. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of

Crofoot Ave. S. E. from E. 81st to E. 82d St. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of Carnegie Ave. S. E. from E. 55th St. to E. 59th St. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of Deveney Ave. S. E. from E. 71st to 831 ft. easterly by grading and paving.

An ordinance has been passed determining to proceed with the improvement of E. 66th St. from Clement Ave. S. E. to Harvard Ave. S. E. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of W. 89th St. from Madison Ave. N. W. to Sauer Ave. N. W. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of Hiesley Ave. S. E. from E. 61st St. to E. 65th St. by grading and paving.

An ordinance has been passed determining to proceed with the improvement of Kenyon Ave. S. E. from E. 59th St. to 600 ft. easterly by grading, draining, curbing and paving.

An ordinance has been passed determining to proceed with the improvement of E. 91st St. from Harvard Ave. S. E. to Cannon Ave. S. E. by grading and paving.

The City Council has adopted resolutions declaring it necessary to make the following street improvements: Grading and paving Bristol Ave. S. E. from E. 70th St. to E. 81st St.; grading and paving Western Ave. N. W. between W. 100th St. and W. 106th St.

An ordinance has been passed by the City Council levying a special tax to pay the cost of grading, draining, setting curbs and paving with 4-in. paving brick on a 4-in. concrete foundation, Lakeview Road N. E. and E. 123d St. and Marble Ave. between E. 77th St. and E. 83d St.

Columbus, O.—An ordinance has been passed providing for the issuing of bonds in anticipation of the collection of special assessments for the following street improvements: Paving Fourth St. between the alley north of Wyandotte Ave. to Hudson St.; grading and paving the alley east of Ninth St. between Beck and Sycamore Sts.; grading and paving Deshler Ave. between High St. and Blackberry Alley; grading, paving, etc., on Engler St. between Pearl and Fourth Sts.; paving East Ave. between Tompkins St. and Arcadia Ave.; grading and paving Born St. between Beck and Sycamore Sts.; improving Dodridge St. from High St. to Findlay Ave.

Elmwood Place, O.—Sealed proposals will be received at the Clk's office, Town Hall, Elmwood Place, Ohio, until 12 noon, July 27, 1912, for the improvement of Chestnut St. from Maple Ave. to the southern terminus of Chestnut St., according to the plans, general and supplementary specifications, profiles and detail drawings of the same as they appear on file in the office of the Clk.

Harrison, O.—An ordinance has been passed authorizing the issuance of bonds in the sum of \$1,000 for the improving of State Ave. by grading, etc.

Lancaster, O.—Sealed proposals will be received at the office of the Commissioners of Fairfield Co., at Lancaster, until 11 a. m. July 31, 1912, for furnishing the labor for grading and paving with a waterbound macadam the Lancaster and Newark road, State Highway "A" pet. No. 449 in Walnut Twp. Length, 22,616.5 ft., or 4.28 miles; width of pavement, 12 ft. Estimated cost of furnishing labor, \$3,630. Date set for completion, Nov. 1, 1912. Plans and specifications are on file in the office of the County Commissioners and the State Highway Dept., Columbus.

Lisbon, O.—Sealed proposals will be received at the office of the Commissioners of Columbiana Co., at Lisbon, until 10 a. m., August 2, 1912, for grading and paving with brick for heavy traffic the Salem and Ellsworth road, State Highway "G" pet. No. 379 in Perry Twp. Length, 5,280 ft., or 1.00 mile; width of pavement, 10 and 14 ft. Estimated cost of construction, \$14,622.64. Date set for completion, Nov. 1, 1912. Plans and specifications are on file in the office of the County Commissioners and the State Highway Dept., Columbus.

Lisbon, O.—Sealed bids will be received by the Comrs. of Columbiana Co. at their office in Lisbon until Aug. 12 for the repaving of the road between Calcutta and E. Liverpool. Part of the material will be of brick and part of Tarvia.

Lorain, O.—Sealed proposals will be received at the office of the Bd. of Co. Comrs. of Lorain County, Ohio, until one

p. m. Aug. 5, 1912, for furnishing material and performing the necessary labor for grading, draining and macadamizing of the North Ridge Road from the east line of Lorain Co., thence in a westerly direction to the center of the road running north of Avon Center in Avon Twp. and in all about 23-4 miles, in accordance with the forms of contract and specifications to be furnished by the County Surveyor.

An ordinance has been passed by the City Council authorizing the improvement of W. 27th St. from the west line of Broadway St. to the east line of Lexington Ave. by grading, draining, curbing and paving with vitrified brick, sheet or block asphalt, and constructing the necessary gutters, culverts and retaining wall.

Marietta, O.—The City Council has passed an ordinance authorizing the improvement of 7th St. between Montgomery and Poplar Sts. by excavating, grading, filling and preparing the foundations, placing drain pipes, constructing catch basins, constructing curbs on each side of the roadway and paving the roadway with brick block to a width of 24 ft., in accordance with plans, specifications, estimates and profiles prepared by the Engr. of the Dept. of Public Service and on file in the office of the Director of Pub. Ser.

Newport, O.—The following streets have been ordered improved: Indiana Alley from Sixth to Ohio Alley; Tenth between Columbia and Monmouth; York from Eighth to Twelfth; Seventh from Columbia to Central Ave., and Ninth from Columbia to York.

Painesville, O.—Sealed proposals will be received until July 30 for grading and paving with bituminated concrete the Weeds Corners Extension Road, Petition No. 372, in Leroy Twp., Lake Co. James R. Marker, State Highway Comr.

Sandusky, O.—Sealed bids will be received until Aug. 15 for the purchase of \$10,000 bonds for constructing pavement and curbing in Taylor St. \$3,500 for the purpose of providing money and constructing pavement and curbing in Huron Ave. Fred W. Bauer, City Aud.

Steubenville, O.—Sealed proposals will be received until July 31 by the Clerk of York Twp., at Steubenville, for grading and macadamizing 2-4-10 miles of road in York Twp. E. L. Bonar, Clerk, R. F. D. No. 1, Powhattan Post, O.

Toledo, O.—A resolution has been passed by the City Council declaring it necessary to improve Glenwood Ave. from the paving in Central Ave. to the southerly gutter line of Castle Blvd. by grading and paving the central 22 ft. with either vitrified brick or asphalt on a concrete foundation or with tar treated macadam or concrete pavement, together with the necessary grading, curbing, retaining walls, drainage, etc.

Upper Sandusky, O.—Sealed proposals will be received until Aug. 7 for the grading, stoning and tar binding of a road beginning on South St., in the village of Nevada (Antrim Township), from the point of intersection with the Morrison Road west to the west line of the incorporated village of Nevada, Wyandot Co. Peter Frank, Jr. is Co. Aud.

Zanesville, O.—Sealed proposals will be received until July 27 for grading and paving with brick for heavy traffic the Maysville Road Petition No. 377, in Springfield Twp., Muskingum Co. James R. Marker, State Highway Comr.

S. Bethlehem, Pa.—Sealed proposals will be received until Aug. 5 for paving with Amiesite portions of Second St., Northampton Ave., New St., Elm St., Fourth St. and Third St. R. E. Neumeyer, Borough Eng.

Bloomburg, Pa.—Main St. of Catawissa will be paved with brick from the river bridge to Fourth St.; Mill St. will be covered with Amiesite from Fourth St. to the Paper Mill bridge.

Harrisburg, Pa.—A petition has been presented by 75 voters of Derry Township asking the County Court of Dauphin Co. to appoint a board of viewers to determine the advisability of abolishing the present road between Sand Beach and Shellsville and laying out a new one.

Sunbury, Pa.—The City Council is planning to pave Second Ave. with vitrified block. Address S. H. McKinner.

Tamaqua, Pa.—Bids will be received July 29 for the paving of Berwick St. and a portion of East Broad St. Address E. L. Boyd, Boro. Eng.

Williamsport, Pa.—Ordinances for the paving of Hepburn and W. Edwin Sts.

from Centre to Campbell St. were approved by the joint highway committee of City Councils at a recent meeting.

Windber, Pa.—A petition has been circulated asking that Somerset Ave. between 18th and 19th Sts. and 18th St. in the east end be paved under the foot front plan.

Sherman, Tex.—J. R. Johnson has prepared plans and will have charge of the construction of the Grayson Co. roads, for which \$400,000 in bonds have been voted. Address J. R. Johnson, Civil Eng.

Temple, Tex.—One hundred thousand dollars will be expended for paving streets. Address City Clk.

Waco, Tex.—The City Commissioners have passed an ordinance for street paving which will require an expenditure of about \$125,000. Bids will be asked for at an early date.

Richmond, Va.—Bids will be received at the office of the Clerk of Henrico Co., Richmond, Va., until 11 a. m. July 27, 1912, for the construction of about five miles of gravel road on the Charles City Road and one mile on the Darbytown Road, in Henrico Co., Va.

Plans and specifications on file at the Clerk's office, Richmond, Va.

Warrentown, Va.—An election will be held in the Cedar Run Dist. of Fauquier Co. August 17 to vote on the proposition of issuing \$60,000 in bonds, which will be supplemented by a subscription of \$14,000 from the automobile fund of the Richmond to Washington highway for the construction of the district's section of the road.

Tacoma, Wash.—The City Council will pave many streets at an estimated cost of \$70,000. Address City Clk.

Wheeling, W. Va.—The Council is planning to pave McCulloch St., in the East End. Address City Clerk.

Merrill, Wis.—A new cement sidewalk will be constructed on the south side of Second St. between Mill and Scott Sts.

Racine, Wis.—Sealed proposals will be received at the office of the City Clk., in the City Hall, up to Saturday, August 10, 1912, at 10 o'clock a. m., for the furnishing of all materials and performing all the labor for the following public work: Grading Stannard St. from Sixth St. to Water St., approximating 3,160 cubic yds. of excavation.

Sealed proposals will be received up to August 3, 1912, at 10 o'clock a. m., for the furnishing of all materials and performing all the labor for the following public work: Constructing concrete lake shore protection from a point 291 ft. south of the south line of Tenth St. to the south line of Twelfth St.

Sealed proposals will be received up to August 10, 1912, at 10 o'clock a. m., for the furnishing of all materials and performing all the labor for the following public work: Paving Park Ave. from Water St. to Sixth St., approximating 1,084 square yards of paving.

Sealed proposals will be received at the office of the City Clk. until August 10 for the following street work: Paving Sixth St. from Main St. to Lake Ave.; paving Park Ave. from Water St. to Sixth St.; paving Eighth St. from Center St. to Racine St.

Waupaca, Wis.—Six thousand dollars will be expended constructing good roads leading to Portage, Wis. Address City Clk.

Bids Received and Contracts Awarded

Coronado, Cal.—The Fairchild-Gilmore-Wilton Company, of Los Angeles, has been awarded a contract at \$74,884 for improving Orange Ave. The work will consist of asphalt paving on a concrete base and constructing curbs, culverts and intakes to the drainage system.

Fresno, Cal.—The Co. Bd. of Svcs. of Fresno Co. awarded the contract to W. E. Finch at \$13,490 for constructing the Coalingo-Parkfield road, about 9 miles long, from Coalingo to the Monterey Co. line. Other bidders were: Max Fentage, \$14,000; R. F. Ball, \$14,150; Thompson Bros., \$14,440. The Svcs. of Monterey Co. are considering bids for the construction of the road from the county line to Parkfield.

Los Angeles, Cal.—Withers & Crites were awarded the contract at \$15,404.11 for improving Cypress Ave. The work consists of grading, graveling, cement curbs and gutters, granite block gutters, cement sidewalks and two culverts with wings.

F. Odemar & Co., H. W. Hellman Buildings, Los Angeles, have been awarded a

contract by the Board of Supervisors of Los Angeles County for work at the County Hospital as follows: 1,254 sq. ft. of cement sidewalk at 12c.; 1,194 ft. of cement curb at 35c.; 803 sq. ft. of driveway at 15c.; excavating, \$200; curb bar, \$50.

The Mercereau Bridge & Construction Co., Pacific Electric Building, has been awarded the contract at \$6,905 for protection work consisting of 6,000 cu. yds. of excavation and 700 ft. of culvert in the Hawthorne Protection District. Olmsted & Cillenen are the engineers.

Withers & Crites, 1120 Wall St., have been awarded a contract at \$15,404.11 for improving Cypress Ave. from the north boundary of the city to Idell St. The unit prices were: \$2.40 per lin. ft. for grading and graveling; 32c. per lin. ft. for cement curb; 15c. per sq. ft. for cement gutter; 50c. per sq. ft. for granite block gutter; 11c. per sq. ft. for sidewalk; \$169 for culverts on Pepper st. and \$171 for culverts on Carlton St.

Redondo Beach, Cal.—G. C. Cummings, of Los Angeles, was awarded the contract for improving Juanita Ave. by grading, graveling, oiling and constructing cement curbs, gutters and sidewalks; amount, \$20,000. He also received the contract at \$2,500 for constructing cement sidewalks on Garnet St.

Tropico, Cal.—D. C. Howard, Merchants' Trust Bldg., Los Angeles, was awarded the contract at \$12,000 for oiling and tamping, grading and constructing curbs and sidewalks on Acacia and Adams Sts.

Hartford, Conn.—Sealed proposals were received by State Highway Cmr. James H. MacDonald July 18 for about 6,415 lin. ft. of special macadam coal tar road under the formula of the State Highway Dept. on the Peat Swamp Road in the town of Norwalk, as follows: L. F. Merritt, Stamford, Conn., \$5.70 per lin. ft. for macadam, \$6.80 for telford, \$1.25 per lin. ft. for rubble drain, \$7 per cu. yd. for concrete walls, \$5.50 for masonry walls, \$3.50 for dry rubble walls; A. D. Bridge's Sons Co., Hazardville, Conn., \$4.94, \$5.84, \$1, \$3, \$6, \$5; David Jenks, Wilton, Conn., \$5 for macadam, 70 cts. for rubble drain, \$6 for concrete walls, \$5.50 for masonry walls, \$4 for dry rubble walls.

Quincy, Ill.—The contract for the paving with brick of Main and Hampshire Sts., between 5th and 8th Sts., and 6th St., between Vermont and Jersey Sts., has been awarded to The A. D. Thompson Paving Co., of Peoria, at \$1.83 per sq. yd.

Burlington, Ia.—The following bids have been received for improving Harrison Ave.: Young & Buescher, grading, 48c. per cubic yd.; curbing, 38c. per lineal ft.; paving, 96½c. per sq. yd. Burlington Constr. Co., grading, 60c.; curbing, 38c.; paving, \$1.10. George Peterson, grading, 47c.; curbing, 48c.; paving, \$1.15½. Fred W. Guenther, grading, 56c.; curbing, 51c.; paving, \$1.23½. John Loftus, grading, 58c.; curbing, 51c.; paving, \$1.30.

Des Moines, Ia.—Contract has been awarded by the City Council to the Bryant Asphalt Co. for paving Crescent Drive from Ingersoll to 34th St., and 41st St. from University St. to Forest St. at \$1.89 per sq. yd. and 45c. extra for grading.

Contract has been awarded by the City Council to The Turner Improvement Co. for paving Euclid Ave. with brick between 6th and 12th St. at \$1.59 per sq. yd.

Glenwood, Ia.—The City City Council has awarded the contract for paving Vine St. to Donovan & Hamilton, of Shenandoah, at \$1.30 per sq. yd., with brick pavement at 57c. per running foot for curb, and \$6.75 per yd. for extra concrete work. Total cost, about \$10,000.

Springfield, Md.—The contract for grading and paving on Nichols St., between Campbell and Main Sts., has been awarded to Fox & Cornwall at \$1.22 per sq. yd.

New Washington, Md.—The contract for constructing the New Washington and Nabb pike has been awarded to Walter Taggart at \$9,742.55.

St. Paul, Minn.—Bids for paving 4th and 5th Sts. with creosoted wood blocks have been received as follows: Republic Co., \$1.65 per sq. yd.; Kettle River Quarries Co., \$1.68 per sq. yd.

Camden, N. J.—The St. Com. of the Camden City Council has awarded a contract for repaving S. 2d St. from Federal to Mechanic St. with Belgian block on a concrete foundation to Aaron Ward at \$2.55 per sq. yd. Total, approximately \$60,000.

Rochester, N. Y.—The Bd. of Contract and Supply has awarded the following contracts for street work: Brick pavement on Parkway, Thomas Holahan, \$19,-

903.50; constructing pavement and sewers at Exposition Park, F. A. Brotsch, \$10,-267.50; constructing brick pavement on Lewis St., H. N. Cowles, \$4,700.

Troy, N. Y.—The following bids have been received for paving 24th St. between 12th Ave. and the Delaware and Hudson tracks: John H. Gleason Co., Mack fire city pavement, \$10,944; shale block, \$10,-848; granite block, \$13,568; grouted concrete, \$8,672. Hassam Pavement Co., Hassam pavement, \$13,760; Hassam grouted concrete, \$8,960.

Cincinnati, O.—The following contracts have been awarded for street work by the Co. Comrs. of Hamilton Co.: Oiling Cleves and Dugan Gap Road, Tyler & Breslin, \$472; constructing culvert on New Haven road, E. Fagaly, \$415.55; oiling Lawrenceberg and Harrison road, Cilizens' Road Preserving Co., \$615; concrete culvert on Blue Rock pike, J. Strong, \$993.75.

San Angelo, Texas.—A contract has been awarded to M. A. Moon, of San Angelo, by the City Council for paving approximately 23,000 sq. yds. with creosoted blocks at \$2.56 per sq. yd.

Pasco, Wash.—The Co. Comrs. of Franklin Co. have awarded a contract to the Inland Empire Hassam Paving Co. of Spokane for two miles of paving at \$17.25.

Superior, Wis.—The following bids have been received for paving 19th St. between Banks and Hammond Aves.: Differ & Peterson, \$7,342.67; Ed. Johnson, \$7,514.51; P. E. Bergman & Co., \$10,254.58; S. A. Riches, \$8,971.69.

The following bids have been received for paving N. 8th St. from Hammond to Catlin Av.: Differ & Peterson, \$14,835.32; S. A. Riches, \$14,967.05; Ed. Johnson, \$16,-533.16; P. Bergman & Co., \$20,085.22.

The following bids have been received for paving Catlin Ave. from 8th to Winter St.: Differ & Peterson, \$1,742.94; S. A. Riches, \$1,984.28; P. Bergman & Co., \$2,-354.10; Ed. Johnson, \$1,920.75. The last two streets will be paved with concrete for a width of 24 ft.

BRIDGES.

Bids Asked and Prospective Work.

Mobile, Ala.—Several bridges are to be constructed across the Alabama River. Address Major Flagner, Mobile.

Sente, Ala.—Bids will be received by the Court of Co. Comrs. of Russell Co. until Aug. 12 for the construction of a 90-ft. concrete arch bridge over Little Uchee Creek. W. S. Keller, State Highway Eng.

Little Rock, Ark.—The Pulaski Co. Comrs. will construct a concrete bridge on 19th St. Address Joe Asher, Co. Judge.

Dover, Del.—The Kent Co. Levy Court has authorized the Clk. to advertise for bids for the building of a concrete bridge over Tappahanna Marsh and also one near Casson's Corner.

Tampa, Fla.—Bids will be received August 6 by the Bd. of Pub. Wks., 28 First National Bank Bldg., for the construction of proposed reinforced concrete retaining walls and bulkhead at approach to Fortune Street bridge. Address D. B. McKay, Chmn.

Cartersville, Ga.—Bids will be received August 7 for the construction of bridges as follows: Steel bridge with concrete substructure at McMichen bridge, over Ross Creek; one steel bridge on Petit's Creek, near J. H. Gilreath's, to be one steel span 48 ft. long, steel approaches 120 ft. long, with concrete piers, abutments and pedestals, roadway 16 ft.; one bridge over Salacoa Creek, near Sam Richards', to consist of one steel span 50 ft. long, steel approaches 54 ft. long, with concrete piers, abutments and pedestals, 12 ft. roadway. Address G. A. Veach, Chmn.

Lawrenceburg, Ind.—Bids will be received by the Commissioners of Dearborn Co. August 12 for constructing two bridges. Address W. S. Fagaly, Co. Aud.

Des Moines, Ia.—The Engineering Dept. has been ordered by the City Council to make borings on the site of the proposed new bridge at 7th St.

Marion, Kan.—Bids will be received August 8 for the furnishing of all materials and construction of the following bridges: One 40-ft. span, reinforced concrete bridge, 16-ft. roadway, located in section 35, Twp 18; one 32-ft. span, reinforced concrete bridge, 16-ft. roadway, located in section 4, Twp. 20. Plans and specifications on file in the office of the Marshall Co. Clk. Address B. B. Reimer, Co. Clk.

Topeka, Kan.—Comr. W. G. Tandy will present to the City Commission a definite plan for rebuilding of 18 bridges in Topeka. The improvement will entail a cost of \$160,000.

New Orleans, La.—City Engineer W. J. Hardee is preparing estimates of the cost of repairing or replacing the Calbarine and Magnolia bridges over the New Basin Canal. Address City Eng.

Tallulah, La.—Bids will be received Sept. 4 for the construction of an 80-ft. span over Willow Bayou, 64-ft. span over Panther Lake, 120-ft. span over Sut Bayou. Address W. H. Harvey, Sec'y.

Duluth, Minn.—The St. Louis Co. Aud. will advertise for bids for the construction of a bridge across Keene's Creek, on the new Gretchell Road. Address Co. Aud.

Batesville, Miss.—Bids will be received by the Bd. of Spvs. for the construction of a steel bridge across Hotopka Creek and a concrete bridge across Jones Ditch. Address R. W. Draper, Clk.

Raymond, Miss.—Sealed bids will be received by the Bd. of Spvs. of Hines Co., at Raymond, until August 6 for the following bridge and road work: Constructing a steel bridge over Maxey Creek, in the 3d Spv's district; for two cars, 85 per cent. heart pine lumber, one car to be delivered at Bolton, Miss., and one car at Edwards, Miss.; for opening up a public road leading from the steel bridge at the intersection of the 4 counties south-east of Terry on the Pearl River; for bridge forms for building concrete bridges and also culvert forms for building the concrete culverts. Address Clk. of the Bd. at Raymond.

Joplin, Mo.—The Union Depot Co. will give \$50,000 towards erecting viaduct here. Address City Eng.

Hastings, Neb.—The Adams Co. Bd. of Spvs. recommends constructing a concrete and steel bridge between sections 18 and 19, Wanda Twp. Petitions for new bridges between sections 13 and 18 were referred to the bridge committee. Address Co. Clk.

Weedport, N. Y.—Bids will be received July 30 for constructing a new substructure and approach spans on the bridge over the Erie Canal at Weedport; estimated cost, \$24,916. Also for contract 101 constructing a highway bridge over the Erie Canal at Three Rivers; estimated cost \$44,600. Address D. W. Peck, Supt. of Pub. Works, Albany, N. Y.

Bellaire, O.—The Co. Comrs. of Belmont Co. at their last meeting approved the plans for a new steel span bridge over Captina Creek at the B. Evans farm in Wayne Twp.

Cincinnati, O.—Sealed proposals will be received until Aug. 16 for a concrete bridge on Neab Rd. near Muddy Creek Rd. west of R. R. at McDuffy's farm, in Green Twp. Albert Reinhardt, Clk.

Sealed proposals will be received until Aug. 9 for bridges and culverts on the Batavia pike, from the Ohio pike to the county line, in Anderson Twp.

The question of a new bridge at Ida St. and a vehicular road through Eden Park connecting Mt. Adams and Walnut Hills will be taken up at the midsummer meeting of the City Council August 6.

Norman, Okla.—The City Eng. has prepared plans for a \$40,000 modern steel bridge to be erected across the South Canadian River. Address City Eng.

Indiana, Pa.—Sealed proposals will be received until Aug. 7 for the construction of a double arch reinforced concrete bridge to be built over Two Dick Creek, Boro. of Clymer, Indiana Co., Pa. J. Bennett, T. M. Ansley, J. M. Wakefield, Co. Com.

Pittsburg, Pa.—Sealed proposals will be received until Aug. 1 for the construction of a concrete arch bridge at No. 1, Dry Run, Jefferson Twp., and for the new creosoted wood block floor on the following bridges: Nos. 3 and 4, Abers Creek, and No. 1, Lobbs Run. R. J. Cunningham, Co. Com.

Richmond, Va.—Sealed proposals will be received by the State Highway Comr. at Spottsylvania, Va., until noon August 3 for the construction of a bridge over the Po River in Spottsylvania Co. Approximate length, 69 ft. 12-ft. roadway. Character of superstructure, steel beam spans; character of substructure, concrete. Plans and specifications at the office of the Clk. of Circuit Ct., and blue prints can be secured from Childrey-Sunday Co., Richmond, Va.

Sealed proposals will be received by P. St. Julien Wilson, State Highway

Comr., at Spottsylvania C. H., until noon August 3 for the construction of a bridge over the north fork of the North Anna River in Spottsylvania Co. Approximate length, 132 ft. 12-ft. roadway. Character of superstructure, steel beam spans; character of substructure, concrete. Plans and specifications can be seen as above.

The Richmond-Washington Highway Assn. and the Virginia State Fair Assn. have asked the Finance Com. for an appropriation of \$25,000 to build a concrete viaduct over the tracks of the Richmond, Fredericksburg and Potomac R. R. at the State Fair Grounds.

Wheeling, W. Va.—Two Ohio county bridges in Peace Twp. west of Wheeling are in bad shape and must be repaired at once.

Bids Received and Contracts Awarded.

Phoenix, Ariz.—The Missouri Valley Bridge & Iron Co. was awarded the contract for the construction of the Cheveion Creek bridge in Navajo Co. It will be a steel structure with a 6½-in. reinforced concrete floor.

Long Beach, Cal.—The Mercereau Bridge & Const. Co., Pacific Electric Building, Los Angeles, was awarded the contract by the Bd. of Pub. Works for the construction of repairs to the municipal pier on their bid of \$26,680. The work consists of reconstructing the concrete piles and repaving the surface.

Los Angeles, Cal.—The Los Angeles Co. Bd. of Spvs. has awarded the contract to the Mercereau Bridge & Construction Co., Los Angeles, for the construction of the reinforced concrete bridge across the Los Angeles River in the Lankershim Road dist. at \$18,690.

Ventura, Cal.—Galley & Clark, Grant Building, Los Angeles, were the lowest bidders, at \$7,250, and were awarded the contract for the construction of three reinforced concrete bridges on the Nordhoff Road in Ventura Co. Other bids received were as follows: Mercereau Bridge and Const. Co., \$7,900; S. M. Kerns, \$7,900; Putnam Stone Co., \$8,485.

J. R. McKnight was awarded a contract at \$11,532 for constructing eleven concrete piers to replace wood piling at the Montalvo bridge. The bids received were: J. R. McKnight, \$11,532; Mercereau Const. Co., \$15,980; Portland Concrete Co., \$18,125; C. W. Corbaley, \$14,943; Midland Bridge Co., \$17,576.

C. W. Corbaley, H. W. Hellman Building, Los Angeles, was awarded a contract at \$2,497 by the Bd. of Spvs. of Ventura Co. for the erection of a concrete bridge over the Laguna Hueneme. The other bids were: Mercereau Bridge & Const. Co., \$2,590, and Ed. Abplanalp, Oxnard, \$2,557.

Des Moines, Ia.—The contract for paving and resurfacing with creosoted wood blocks the floor of the Grand Ave. bridge has been awarded to O. P. Herrick at \$4.75 per sq. yd.

Sandford, Me.—The selectmen of the towns of Sandford and Alford have awarded the contract for the construction of the proposed new bridge at Whiche's Mills to the Canton Bridge Co. of Canton, O., for about \$3,500.

Woodbury, N. J.—The Bd. of Freeholders of Gloucester Co. has awarded the contracts for two county bridges to Edward Steelman, of Salem, at \$1,795 and \$1,745, respectively.

Philadelphia, Pa.—The following bids have been received by the Bureau of Highways for constructing a bridge on the line of Marshall Road over Cobbs Creek: Edward Fay & Son, \$2,195; H. & J. B. McHugh, \$1,649; C. P. Grim & Co., \$1,780, and Daniel J. Bader, \$1,700.

BONDS

Santa Rosa, Cal.—The Sonoma Co. Development Bd. has taken initial steps looking toward bonding Sonoma Co. for \$1,000,000 for the building of roads. This is exclusive of the state highway. It is proposed to construct about 200 miles of roads. Judge Hugh N. Latimer of Windsor; John P. Overton of Santa Rosa, and William B. Whitney of Healdsburg, are interested.

Tampa, Fla.—An election will be held August 20 to decide the question of issuing \$1,200,000 municipal bonds. Address City Clk. Johnson.

Sanford, Fla.—\$200,000 in bonds has been voted for constructing 22 miles of brick roads. Address City Clk.

Clayton, Ill.—An election will be held August 6 to decide the question of issuing \$10,000 sidewalk bonds. Address City Clk.

Moline, Ill.—Petitions are in circulation in South Moline Twp. for a special township election to be held on the issuing of \$15,000 road improvement bonds.

Rock Falls, Ill.—An election will soon be held to vote on the question of issuing bonds for paving purposes. Address City Clk.

Fulton, Miss.—Bids will be received August 5 for the sale of \$21,000 worth of good road bonds in the Fourth Spvs. Dist. Address T. A. Senter, Clk.

Vicksburg, Miss.—The Vicksburg Bd. of Trade has petitioned the Bd. of Spvs. of Warren Co. to issue bonds to the amount of \$150,000 for building a uniform county road system.

Webb City, Mo.—Instructions to the City Attorney to prepare an ordinance calling for a special election to vote on a \$17,000 bond issue for the construction of storm sewers was ordered by the City Council at a recent session.

Columbus, O.—An ordinance has been passed by the City Council to provide for the issuing of bonds in anticipation of the collection of special assessments for the improvement of East Ave. between Tompkins St. and Arcadia Ave.

Fremont, O.—The City Council has decided to issue bonds in the sum of \$10,000 for improving a number of the city streets.

Minister, O.—Twenty-five thousand dollars in bonds have been voted for street improvements. Address City Clk.

Norman, Okla.—An election will be held August 6 to decide the question of issuing \$20,000 bridge bonds. Address Co. Clk.

Greenville, Pa.—One hundred thousand dollars in bonds has been voted for paving purposes. Address City Clk.

Spartanburg, S. C.—In a special election here yesterday this city authorized a bond issue of \$200,000. Twenty thousand dollars will be used in the extension of the sewerage system and \$90,000 in street paving.

Chattanooga, Tenn.—The town of Look-out Mountain will vote on the question of the issuance of \$25,000 street improvement bonds on Aug. 8.

Lawrenceburg, Tenn.—October 5 an election will be held for the purpose of voting on an issue of \$200,000 in bonds for macadamizing roads. Address Co. Clk.

Athens, Tex.—At a recent election a \$35,000 bond issue for the purpose of constructing roads was authorized by the voters.

Beeville, Tex.—Bee Co. contemplates calling an election to vote on issuing bonds for the construction of good roads throughout the county.

Dublin, Va.—An election will be held July 30 to decide the question of issuing \$100,000 roads bonds. Address C. W. Haman.

Lawrenceville, Va.—Eighty-one thousand dollars in bonds have been voted for the construction of Brunswick Co. roads.

MISCELLANEOUS

Washington, D. C.—A report from an American consul states that the municipal officers of a seaport city in his district are seriously considering the adoption of some modern method of street sprinkling. The idea is to use sea water, having a main pumping plant and a piping system for distribution, or pumps and tanks placed at convenient intervals for filling sprinkling carts. If American manufacturers of street sprinkling apparatus, horse-drawn, auto, and trolley sprinklers, will send three or four sets of catalogues and price lists direct to the consulate, together with reports concerning sprinkling assessments, contract systems, and the results obtained in American cities through the use of sea water for street sprinkling, or other information that would be valuable to the foreign officials and business men who are interested in making the city in question wholesome and clean, the consul will undertake the delivery of the catalogues and other particulars. He will afterwards notify the firms interested as to the probable action of the foreign city council regarding the purchase of sprinkling material. Address Bureau of Manufactures, Dept. of Commerce and Labor, File No. 9222.

An American consular officer reports that an importing firm in his district desires to correspond with American firms producing traction engines. Address Bureau of Manufactures, Dept. of Commerce and Labor, File No. 9223.

Jackson, Tenn.—A contract was closed yesterday for the application of 50,000 yards of liquid asphalt on the streets of the city. The cost will be about \$10,000.

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SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 26,824 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the north city line of Altoona, station 374 + 99.6, to the Blair-Cambria County line, station 641 + 44, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Hollidaysburg, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$4,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 221 in Blair County, Logan Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,988 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: From the borough line of Edgeworth and extending in an easterly direction to the Backbone Road, near the property of the Allegheny Country Club, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Sewickley Heights Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 9,524 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Extending from the improved road at Warrendale, near Brush Creek, in a northerly direction to the Butler County line under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route 246 in Allegheny County, Marshall Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 12,104 lineal feet of asphaltic-macadam road, 14 feet wide, situated as fol-

lows: From station 1576 + 57.35, on Route 123, near the property of D. D. Schriever, and extending in a southeasterly direction to the cross roads beyond the village of Hunterstown, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at 54 Hartman Building, York, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Adams County, Straban Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 10,996 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From the Village of Woolrich, station 0 + 00, to Dunnstable township line, station 92 + 42; and from Pinecreek township line, station 99 + 82, to River Road at station 117 + 36 on Route No. 23, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton County, Pinecreek Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 740 lineal feet of asphaltic-bituminous macadam road (penetration method), 14 feet wide, situated as follows: From Pinecreek township line at station 92 + 42, to Pinecreek township line at station 99 + 82, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut St., Philadelphia; 2117 Farmers' Bank Building, Pittsburgh; and at Clearfield, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Clinton Co., Dunnstable Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30, 1912, when bids will be publicly opened and scheduled for the reconstruction of 3,510 lineal feet of brick block pavement, 16 feet wide, situated as follows: From 5th Ave. extension to State St., on Pennsylvania Ave., under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed

in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Versailles Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5,833 lineal feet of brick block pavement, 16 feet wide, situated as follows: From the east line of Albion borough and connecting with the State Highway in Conneaut Township, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Erie County, Albion Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 8,077 lineal feet of brick block pavement, 14 feet wide, situated as follows: From end of present improved road, station 1412 + 33, near the property of George Runyon, and extending in a northwesterly direction through Conneaut Township to station 1493 + 10, near the property of George Kenidy, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; 1001 Chestnut Street, Philadelphia; and at Warren, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$2,000, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road on Route No. 85 in Erie County, Conneaut Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 7,400 lineal feet of telford-macadam road, 16 feet wide, situated as follows: From the property of E. S. Case through the village of Shirksville to the property of Reuben Young, station 74 + 00, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 2117 Farmers' Bank Building, Pittsburgh; and 1001 Chestnut Street, Philadelphia, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$1,500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Lebanon County, Bethel Township."

EDWARD M. BIGELOW,
State Highway Commissioner.

SEALED PROPOSALS.**COMMONWEALTH OF PENNSYLVANIA.**
State Highway Department.
HARRISBURG, PA.

Sealed proposals will be received at the office of the State Highway Department

in the Capitol Building, Harrisburg, Pa., until ten o'clock on the morning of July 30th, 1912, when bids will be publicly opened and scheduled for the reconstruction of 1,790 lineal feet of asphaltic-bituminous macadam road (penetration method), 16 feet wide, situated as follows: Beginning at the Woodland Road and extending in an easterly direction to the township line of Sewickley Heights, under the Act of Assembly approved May 31, 1911, P. L. 468. Plans and specifications can be seen at the office of the State Highway Department, Harrisburg; 1001 Chestnut Street, Philadelphia; and 2117 Farmers' Bank Building, Pittsburgh, Pa. Each bid must be made upon a blank furnished by the State Highway Department, accompanied by a certified check in the sum of \$500, enclosed in a separate sealed envelope (which blank and envelope will be furnished upon request) marked: "Proposal for the Reconstruction of a Section of Road in Allegheny County, Edgeworth Borough."

EDWARD M. BIGELOW,
State Highway Commissioner.

NOTICE TO CONTRACTORS

TRUNK LINE STATE ROAD WORK.

Sealed proposals for building a section of state road 4.54 miles in length on the designated trunk line in the towns of York and Wells will be received by the state commissioner of highways at the State House, Augusta, Maine, until 3 o'clock P. M., Monday, July 29, 1912.

Alternate bids will be received for the construction of concrete and bituminous macadam.

Specifications, and blank forms of proposal will be furnished upon application and a full set of plans may be seen at the office of the State Highway Commissioner, Augusta, Maine, and at the Mousam House Kennebunk, Maine.

No proposal will be considered unless made on the regular form furnished by the state highway department.

Each bidder must accompany his bid with a certified check payable to P. L. Hardison, State Commissioner of Highways, for 10% of the amount of his bid.

The successful bidder will be required to furnish a bond as provided by the state road law.

The right is reserved to reject any and all bids.

Proposals should be endorsed "York-Wells Trunk Line" and addressed to

P. L. HARDISON,
State Commissioner of Highways,
Augusta, Maine.

PROPOSALS

MACADAM ROADS.

Wilmington, Del.
Notice—Sealed proposals, addressed in writing to the New Castle County State Highway Commissioner and endorsed "Proposals for building a macadam road in the county of New Castle and State of Delaware," will be received by said highway commissioner at his office, Room 3, Basement of Church Building, Tenth and Market streets, Wilmington, Delaware, until 12 o'clock noon, on August 6, 1912, for building the following named water bound macadam roads:

The road from the end of the Hillside Mills stone road to the Pennsylvania State line, passing through Ashland and Yorklyn, a distance of 2.32 miles.

The road from Mendinhall's Mill to the Limestone Road, a distance of one mile.

The State Road through Blackbird, a distance of .78 mile.

All said bids or proposals must be made upon blank forms to be obtained from said highway commissioner at his said office, and the bids for each road must be accompanied with a certified check for \$500, payable to the President of the Levy Court of New Castle county, or with a bond to the State of Delaware in the sum of \$500, as surety that if a proposal be accepted, a contract will be entered into.

Plans and specifications can be seen at the office of said commissioner on or after July 27, 1912. The right to reject any or all bids is expressly reserved.

FRANCIS A. PRICE,

New Castle County State Highway Commissioner.

FOR SALE

I have for sale for IMMEDIATE Delivery:

- 1 Kelly-Springfield Road Roller, 10 Tons.
- 1 Austin-Western Sprinkler Wagon.
- 1 Longenecker Scarifier,
- 2 Tar Kettles,
- 1 Frick Contractors Traction Engine,
- 8 Wheeler Scrapers,
- Plows,
- For Delivery about September 1st, 1912.
- 2 No. 4 Champion Crushers,
- 1 Portable Engine and Boiler,
- Complete Crushing Outfit Now Running,
- 10 Ton Roller and Sprinkler Wagon.
- All in good condition. Anxious to sell.
- Prices right. Located at Baltimore, Md., and Portsmouth, Va.

E. PARKE LINDSAY,
Portsmouth, Va.

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Chemist, Institute of Industrial Research

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
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NEW YORK, AUGUST 3, 1912

Number
5

Highway Work in Massachusetts

The nineteenth annual report of the Massachusetts Highway Commission, covering operations during the fiscal year ending November 30, 1911, has recently been issued. As usual, the report is in two parts, the first relating to state highways and motor vehicles and the second to the supervision of telephone and telegraph companies.

The portion devoted to highways and motor vehicles comprises a general report, including a statement of expenditures, made by Commissioners William D. Sohler and F. D. Kemp; Appendix A, comprising the report of Chief Engineer A. W. Dean; Appendix B, containing information relative to the work of the automobile department, by F. L. Austin, Chief Examiner and Inspector; Appendix C, consisting of the report of E. W. Breed, Forester of the Highway Commission; Appendix D, comprising the report of F. W. Rane, State Forester; Appendix E, comprising the report of H. W. Clark, Chemist; Appendix F, consisting of a table showing highways laid out or contracted for by the commission, and construction expenditures to December 1, 1911; Appen-

dix G, showing towns and cities in which work has been done during 1911, with the dates of the beginning and ending of work and the names of the resident engineers; Appendix H, showing contract prices on state roads during 1911; Appendix I, comprising a statement of claims against the commission; Appendix J, consisting of a table showing maintenance data, including costs during 1911; Appendix K, comprising data on petitions received and layouts made; Appendix L, giving data on "small town" work, and Appendix M, showing appropriations for road work in various years.

The total expenditures during the year, according to the report, amounted to \$1,250,219.39. Of this amount, the principal items were as follows: Construction, \$404,874.34; construction under "small town" acts, \$80,784.89; road repair and maintenance (from revenue,) \$213,475.85; road repair and maintenance (from motor vehicle fees fund), \$366,846.22; general expenses, including salaries of commissioners, traveling expenses of commissioners, salaries,



A BITUMINOUS ROAD BUILT BY THE MASSACHUSETTS STATE HIGHWAY DEPARTMENT AT NORTH ANDOVER, MASS.



MACADAM ROAD WITH OIL BLANKET SURFACE AT WAYLAND, MASS.

rent, office expenses and miscellaneous items, \$47,543.55; expenditures connected with automobile registration, \$63,712.64. Most of the remainder of the total expenditure was used in connection with the supervision of telephone and telegraph companies.

According to the report of Chief Engineer Dean, preliminary surveys and estimates were made on contemplated state highways having a total length of 28.43 miles in 25 towns. Lines and grades for construction work on state highways were established in 44 towns, covering a total distance of 53.59 miles. A part of this work was done on roads upon which construction had been commenced in 1910. Final surveys and measurements were made on contemplated state highways in 34 towns, the roads on which this work was done having a total length of 44.93 miles. In "small town" work, preliminary surveys, including both plans and pro-

files, were made on a total of 47.60 miles of road in 77 towns. In addition to this work, surveys were made of 8.43 miles of road in 12 towns, the work to be done by the towns. In connection with this work, plans, profiles and cross sections of state roads, having a total length of 28.51 miles in 25 towns, were prepared, and layout plans were made for 41.96 miles of road in 37 towns. Plans to accompany decrees for street railway locations on state highways were made in 18 towns.

According to the data on bridges in Mr. Dean's report, seven reinforced concrete bridges were built during the year. These included two 18-ft. span reinforced concrete beam bridges, in the construction of one of which the old masonry abutments were faced with concrete; a 12-ft. reinforced concrete beam bridge; a 10-ft. reinforced slab bridge; a 42-ft. reinforced concrete arch bridge; a 20-ft. reinforced concrete beam bridge, and a 21-ft. reinforced concrete beam bridge. Designs and estimates were also made for five bridges. The State Highway Department also designed the new bridge built by the Norfolk County Commissioners over the Charles River at the Medway-Franklin line. The work consisted of the removal of an old stone arch and the construction of a concrete arch in its place.

In regard to state highways, Mr. Dean states that 9 miles of road, contracts for which were opened at the beginning of the year, were completed, and that the construction was also completed on 31.37 miles of road on which work was commenced during 1911, making a total of 40.37 miles of road completed during the year. Of the completed roads, 7.77 miles were of water bound macadam; 5.37 miles were of gravel; 4.57 miles were of sand bound with oil; 4.07 miles were of bituminous macadam (macadam with a bituminous binder applied by the penetration method); 14.61 miles were of water bound macadam on which an oil surfacing was applied, and 3.98 miles were of gravel having the top course bound with bituminous binder. In addition to the work completed, construction was commenced but not completed on 22.9 miles of road in 22 towns.



A MASSACHUSETTS STATE HIGHWAY IN THE TOWN OF CHESTER—SHOWING SIDEHILL CONSTRUCTION AND TYPE OF RAILING USED.

Work under the "small town" act included the construction of 45.9 miles of road in 80 towns. In addition to this, contracts were made but not completed for 8 miles in 7 towns.

In regard to the maintenance of state highways, Mr. Dean states that bituminous materials were used in the maintenance of 240.48 miles of road during the year, and that at the date of the report there were in the state 545.47 miles of state highway on which bituminous material had been used, either in construction or maintenance. While there have been a few failures of bituminous roads, Mr. Dean states, the use of bituminous material seems to be the only possible way of preserving the roads under the present traffic conditions. He recommends the continued use of this material in construction and maintenance so far as available funds will permit.

In the report of the commission, considerable detailed information is given regarding the operation of the highway department, the policies pursued by it and the results secured. During 1911, according to the report, the commission continued its policy of filling in the gaps in the main thoroughfares in the state. The construction has usually been in the smaller and poorer towns where the roads are located on main lines used to a considerable extent for through travel between the larger cities and towns, and used also by tourists from outside the state. Among the roads on which work has been done are the main road towards Provincetown, the road between Falmouth and Barnstable, and the road toward Woods Hole. Considerable work was also done on routes leading north, west and south from Boston and to the Cape, on the road running north and south through the Connecticut River valley, on roads between Worcester and Fitchburg, and between Worcester and Providence, and from Fitchburg to the New Hampshire line. Allotments were also made for work on the road running north from Pittsfield, the road between Pittsfield and Springfield, the road between New Bedford and Taunton, and the road between Fall River and Providence.



MASSACHUSETTS MACADAM ROAD IN THE TOWN OF LENOX.

A portion of the \$80,784.89 expended in "small town" work was allotted in 1911; the remainder was money which had not been expended during previous years and had been carried over. This work, the detailed mileages of which have already been given, is an important part of the commission's work. The amount the commission has had available for this work each year has been \$25,000 for use in towns of less than \$1,000,000 valuation in which no contribution was made; \$25,000 for use in similar towns which contributed an equal amount, and \$25,000 for use in towns of over \$1,000,000 valuation which contributed an equal amount. For the past few years, according to the report, so much interest has been manifested by the towns themselves that the commission has not had sufficient money available to meet the appropriations made by the towns. In some instances, it is stated, three times as much money has been appropriated as the commission was



REINFORCED CONCRETE ARCH BRIDGE, 110 FT. IN LENGTH, OVER THE WESTFIELD RIVER IN THE TOWN OF CHESTER, MASS.

able to meet, and, consequently, the towns' allotments have lapsed and the work has not been done. Because of this condition, the commission adopted, so far as possible, the policy of first complying with the requests of the smaller and poorer towns which were not on through routes and where no state highway money had been appropriated, and also in those towns where little or no money had been allotted in the past. The commissioners feel that this is the most fair and just policy, since there are many towns in Massachusetts which cannot afford to build or maintain such roads as are absolutely needed and, moreover, where the roads are not on through lines of travel they cannot be aided from the state highway money nor from money available from the motor vehicle funds for use on through roads in towns.

Attention is called in the report to the increasing importance of the maintenance question because of the increase in the length of state highways and the amount of through automobile travel and the more extensive use of motor trucks for long distances in and out of the larger cities. As previously noted, the commission spent over a half million dollars in the maintenance of state highways during 1911, of which \$200,000 was provided by direct appropriation of the Legislature and the remainder was made available under the terms of the motor vehicle fees act. It has been necessary, according to the report, to resurface many miles of state highway, especially where the roads were subjected to heavy automobile traffic. On the through routes, it is stated, this has almost invariably been done by the use of some bituminous material. In regard to the use of this material, it is stated that it has yearly become more evident that with the increasing automobile traffic it is absolutely essential that on the through routes, at least, and on any roads that carry much automobile traffic, some bituminous binder be used to prevent the road from raveling and that it will probably be more economical in the long run to incorporate the bitumen with the top course of stone. The application of these materials under pressure, it is stated, has been found to produce more uniform results than were secured by the gravity method, and the

commission has also been successful in applying some of the extremely heavy bituminous materials by means of pressure distributors. These heavier materials have been applied in grouting as well as in surface treatment, and it seems probable, it is stated, that it may be possible in the future to use some of the bituminous materials containing large quantities of asphalt by this method and thus secure greater permanency both in construction and in surface treatment.

During the past year, the commission has used over 1,500,000 bbls. of bituminous material in the construction and surfacing of its roads, the materials used including tars, asphalts and oils. The tars and oils used have conformed to the requirements of the commission's specifications, samples being analyzed by the chemist of the State Board of Health. Some 240 samples were analyzed during the year, and H. W. Clark, the chemist, states that, from a laboratory point of view, the materials secured were somewhat better than those obtained during the previous year, although there was too much variation in the different lots of what purported to be the same materials and some of them frothed badly when heated. This lack of uniformity in materials, the commission states, is largely responsible for the fact that some of the roads on which they were used are in good condition while others are not.

During 1911, as stated in the report of Chief Engineer Dean, about 240 miles of road either received a bituminous surface treatment or were resurfaced with a bituminous top, the expenditure of the commission for this being \$310,000. Sixty per cent. of the state highways, according to the report, have now been built with the use of bituminous materials or else have been given a surface coating with them. Some of the sections that were treated with oil or tar two or three years ago have had to be treated again, it is stated, while, on the other hand, some roads carrying a considerable amount of automobile traffic that were treated with asphaltic oil three years ago are now in very fair condition although no work has been done on them except to patch holes. It seems to the commission, it is stated, that a surface coat of asphaltic oil would not prove



A MASSACHUSETTS STATE HIGHWAY IN THE TOWN OF LAKEVILLE, PLYMOUTH COUNTY.

to be economical or satisfactory on roads carrying a large amount of heavy teaming, although it has been satisfactory on roads carrying a large amount of high speed automobile travel with but few heavily loaded teams.

In regard to the condition of the state highways, the report states that, speaking generally, they were in better condition at the end of 1911 than at any time in the past. There has not been enough money available to enable the commission to resurface or to surface with a bituminous material many miles of state highway that required such treatment, nor has there been enough money available to even adequately maintain them. It has been necessary, therefore, to adopt the policy of making the available money go as far as possible by working first on the more important roads and on those most in need of repair. On about 42 miles of road the commission was obliged to use a thin coat of light oil, which was only sufficient to last a part of the season, in order to prevent the roads from raveling too much. It is hoped, however, that by the end of 1912 almost all of the main through lines will have been treated with some bituminous material which will prevent them from being unduly damaged by automobile travel.

In that part of the report relating to the automobile department, much statistical information is given in regard to the operation of automobiles throughout the state, especially as regards license fees and accidents. During the year, 4,648 persons were examined for licenses, 6,152 examinations being held. Of those taking examinations, 4,119 finally succeeded in passing, while 529 failed. Data on the accidents in which automobiles have been involved, of which the commission has had notice during the fiscal years of 1910 and 1911, are shown in the accompanying table:

DEATHS, INJURIES, ACCIDENTS.

	1910.	1911.
Total number killed	77	110
Total number injured	963	1,248
Total number accidents	1,182	1,531
Total number accidents in day time	867	1,098
Total number accidents after dark	315	433
Total number accidents on country roads	222	280
Total number accidents on city or town streets ..	960	1,251

Of the total number killed or injured in 1911, 538 were occupants of automobiles, 548 were pedestrians, 73 were bicycle riders, 154 were occupants of carriages and 9 were street car passengers. According to 3,322 abstracts of court proceedings received from the courts during the year, 2,911 persons were convicted of violations of the automobile law, 104 were found not guilty, 305 cases were appealed, 572 complaints were placed on file and 102 were not-prossed.

During the year, 38,907 automobiles and 3,658 motor cycles were registered, besides which there were issued 870 manufacturers' and dealers' registrations. The amounts collected in fees were as follows: From automobiles, \$380,760; from manufacturers' and dealers' registrations, \$24,849; from motorcycles, \$7,030; in operators' license fees, \$64,778.95. The total amount collected from registration fees, license fees, sundry receipts, etc., was \$477,417.95.

Cleaning the Debris from the Streets of Messina

The work of clearing up the debris in the streets of Messina, the Sicilian city destroyed by an earthquake in December, 1908, has progressed very slowly.

Up to July 1, 1911, according to Consul Arthur Garrels, of Catania, in the "Daily Consular and Trade Reports," there had been no evidences of any serious undertaking of the actual work. The first two and a half years after the catastrophe were devoted to the erection of temporary shelters, some six or seven permanent new buildings and a desultory removal of the debris from the main streets.

At that time systematic work was begun under contract, the city advancing the money and the benefited property being assessed in payments in installments running over a period of years. The plan of reconstruction includes raising the level of the city and extending the harbor front. In removing the ruins, both ordinary Sicilian carts and contractors' railways equipped with reversible cars are used. The loaded cars run down to the dumping ground by gravity and are drawn back empty by horses.



A MASSACHUSETTS STATE HIGHWAY IN THE TOWN OF CHARLEMONT, FRANKLIN COUNTY.

The Public Street Systems of the Cities and Towns About Boston in Relation to Private Street Schemes*

By ARTHUR A. SHURTLEFF†

Had you the power to rebuild your cities of the West and the East, taking counsel of the past to make your future plans perfect, whom would you trust to rearrange your streets? Would you consult with the philanthropists and draftsmen who devised the rigid gridirons of Philadelphia, Chicago and San Francisco, or would you turn for counsel to the farmers, traders and shipbuilders, who fashioned the meandering street system of the district about Boston?

In other words, would you seek the advice of men lacking topographical sense, but industrious with the T square, dividers and theodolite, or would you confer with men acute in perceptions of gradient and site, but lacking the most rudimentary knowledge of mapping and composition? Doubtless you would feel little inclined toward either of these groups of men, and yet the district about Boston owes to farmers, traders and shipbuilders the best system of radial thoroughfares in America, and for the want of the coordinating faculty of the dullest philanthropist and the stupidest draftsman, this district stands a strong chance of possessing the worst system of circumferential highways in the world. A brief review of the parts which have been played and which remain to be played near Boston by these two groups of apparently incompetent men may be of interest to students of city design.

Boston was founded by men whose lifelong contact with shipping, lumbering, farming and trade had taught them the strategies of town placing. These pioneers scanned the coast for weeks and finally settled here in Boston under the conviction, which we also hold, that a more perfect spot for human habitation and industry was not to be found. They saw the value of this protected, incured shore, and the three navigable streams which watered a gravelly country of moderate contour, backed by an amphitheatre of high rock hills. At the focus of this natural combination, where the harbor shore was deepest, they built their houses and wharves. A brisk inland trade springing up from this young community quickly brought about the formation of a system of radiating trails leading to Plymouth, Hartford, Northampton, Ticonderoga, Haverhill and Quebec. These primitive thoroughfares were laid out as direct as possible, but with careful, even sensitive regard for the contour of the hills and river valleys to secure gradients moderate enough for heavy pack trains and clumsy vehicles. The endurance of man and beast covering a period of many generations tested and fixed the line and grade of these primordial radials in a manner which we cannot but admire today. Our own knowledge of highway location has nothing to offer to improve the work of these early toilers, except in so far as our use of machinery enables us to overcome obstacles which they avoided. The principles which they practiced are the principles which we have learned to use. Those were ideal times for the growth of convenient through roads when man had only to struggle against natural difficulties and before the more serious barriers of land title and building obstruction had come into existence. Man-made obstacles have become more compelling in our own time until difficulties of topography are reck-

oned as of little consequence compared with conflicts with land and buildings.

The system of roads which was derived in this scientific, though rustic, manner, and which was extended and improved during the last two centuries by the various way cities and towns is shown in Figure 1. That so admirable a system of thoroughfares was secured automatically through the agency of systematically placed river valleys, shore lines, and general ground contours, coupled with the well distributed trading interests of the interior, is both fortunate and astonishing. Conscious planning, except of the line and gradient of each separate radial, was never applied to this system. No general scheme for the placing of these roads was ever worked out, and no cooperation regarding them on the part of the cities and towns through which they pass has ever been accomplished, with the one exception that a metropolitan commission has carefully described them and reported the need of taking them systematically in hand.

It will be seen at once that the polar forces which produced this system of radials could not exert as great an influence upon the development of thoroughfares tending to unite the district by circumferential ties. Figure 2 shows to what degrees coordination has occurred on these crossroads. The concentric position of these fragments, which all but unite to form a complete system, is wholly the result of natural forces working for and against town to town communication, and is not a consequence of deliberate planning, except in the instance of parkways built within the last twenty years. Our forbears had no knowledge of these tendencies of their roads to group themselves, and they had no conception of the advantages of a system which would permit vehicles to not only pass conveniently from one town to its adjoining neighbor, but to continue without detour through town after town to more distant centers.

Figure 3 indicates how completely the orientation of the scattered cities and towns about the parent Boston is determined by the direction of the main radials upon which the towns were founded. The common origin of these settlements, their common dependence upon the city of Boston, and the similarity of their daily life expresses itself in a singular uniformity of plan. Their street systems had the same naive origin as the streets of the metropolitan district. These centers were laid out upon approximate checkerboard systems modified to avoid irregularities of the ground and to lend themselves to arbitrary property lines and to other local difficulties. Without exception the main street of this checkerboard leads directly towards Boston. The street of second importance is usually a cross street leading to the nearest lateral community. Streets leading to adjoining communities on the opposite side of this main road rarely, if ever, connect directly with the first lateral. This characteristic jog at the crossing of the main street is of no great hindrance to the business of the town, but it constitutes a very serious obstacle in cross district communication. The characteristic plan of the majority of the cities and towns about Boston, including Lexington, Malden, Melrose, Everett, Waltham, Watertown, Weymouth, Brookline, and many others is illustrated by the accompanying diagram. This plan also typifies the heart of old Boston in which the main street

*Paper presented at the Fourth National Conference on City Planning, Boston, Mass., May 27-29, 1912.
†Landscape Architect, Boston, Mass.

is represented by State Street and the lateral streets by Devonshire Street, Merchants' Row and Broad Street, all of which cross State Street with annoying jogs. The serious handicap to business and to traffic which has been occasioned by this street arrangement in Boston is sufficient evidence of the evils which are to be expected from its repetition throughout all the older towns of the district.

Singularly enough, at this day when the need of trunk communication throughout the district is greatest, and at a time when the methods of securing coordination are best understood, we are least able to take advantage of the good thoroughfare work which has already been done so miraculously, and to head off the bad work which is creeping in. Our present problem is not so much to secure roads to fill the gaps between the cities and towns while correcting some of their imperfections, but it is rather to prevent individual landowners from clogging vacant lands with crooked roads, which by offsets, dead ends and bad gradients tend effectually to block future thoroughfare development altogether. Blockades of this kind cannot be overcome, like topographical barriers, by the steam shovel and the rock drill because they are fixed by legal entanglements and solidified by custom and investment until they become adamant.

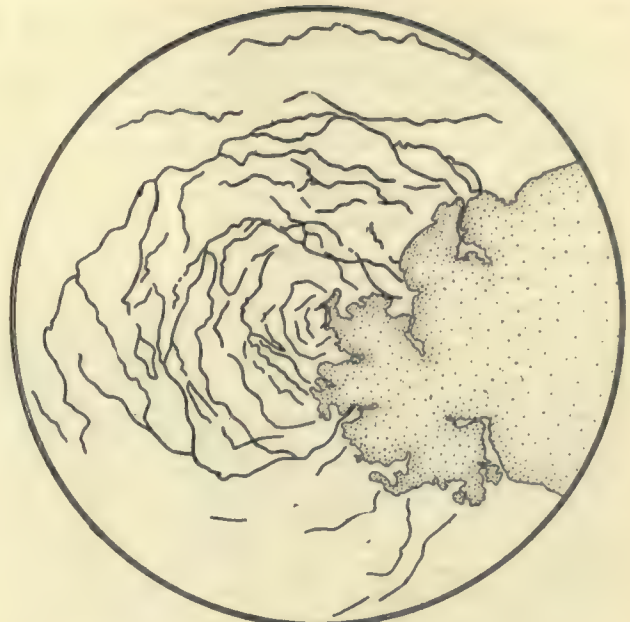


FIGURE 2.

service. To such purchasers the extension of important thoroughfares is of no interest, and to the land speculator these main connections too often stand for an interference with personal rights. It is unfortunate that a prompt return from the sale of land cheaply subdivided and cheaply described is often a better policy for the land operator than a carefully planned subdivision of better site and gradient, which eventually may bring greater returns but at heavier initial cost for plans, construction and transfers and fraught with the risk of delays. It is to our discredit that there is no effective legal process by which this community can secure for itself without prohibitive cost the control of street layouts essential to the convenient development of the whole district.

We have seen that a fine system of radials has been se-

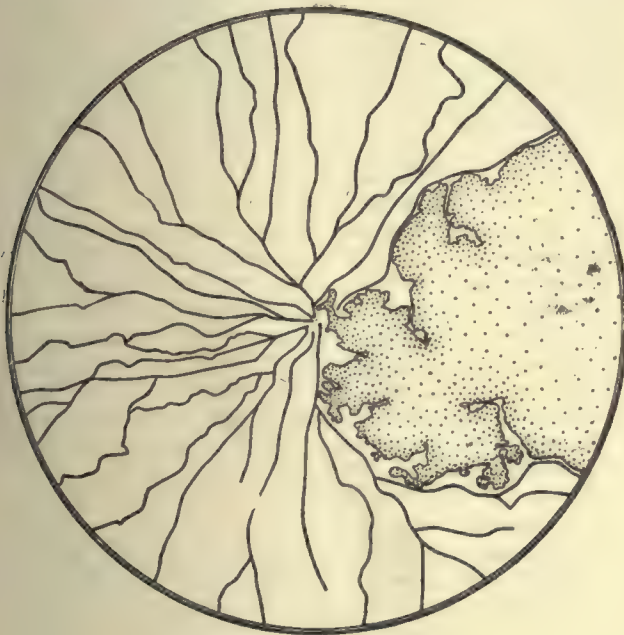


FIGURE 1.

Road building in the district about Boston was never so active as at present, and yet, measured by its service to main transportation, this activity was never so futile. Private individuals are building streets in many of the cities and towns faster than the authorities can provide sewers, sidewalks, water and light. Town and city engineers are often obliged to devote their entire time to problems connected with these mushroom developments, which might have been solved in a moment's time had the streets been properly located and connected. Private individuals have the right to take the initiative, and the towns follow as best they may. Many of the communities about Boston have given up all hope of controlling the line and gradient of private land subdivisions, so weak are the powers delegated to the public to protect its own interest, and so expensive are the costs of correcting ill-adjusted streets when finally built. Few promoters of land subdivisions are interested in the future of the towns in which they operate; they cater to a market of small purchasers to whom readiness of access to the nearest car line, railway station or provision store is the only requisite of highway

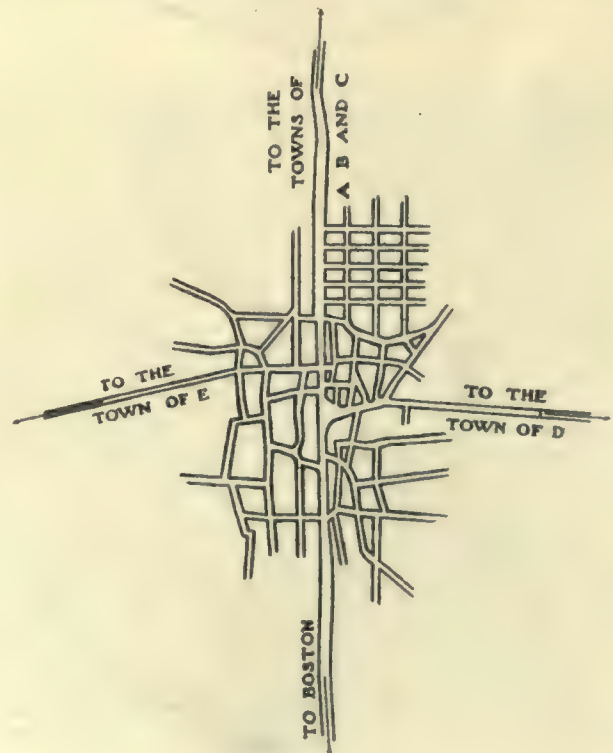


FIGURE 3.

cured for the Boston district largely through the unconscious efforts of frontiersmen. These men have also secured to us the rudiments of a logical system of circumferential thoroughfares. To us it now remains to perfect the work so well begun. We do not need a Hausmann or a L'Enfante to solve the riddle or to start anew with a clean sheet of paper. The scheme of our road system is already fixed and promises, when completed, to be one of the most logical and convenient in the world. (See schematic diagram with footnote.) When the gaps are filled and the more evident connections established, we may expect the plans of Paris and Washington to seem by comparison wanting in convenience and variety. It will be too early for us to boast, however, until the hundreds of miles of private roads which are being built here each decade are made to conform to this scheme. No brilliant intellect or ingenious wit is required to draw the plan, the most ordinary draftsman can fill in blanks so obvious. Real ability is needed rather to defend public rights of unhampered trans-

portation against the petty rights of individuals to interpolate in a great plan of thoroughfares whatever hindrances in the form of irrelevant private streets fancy or means may suggest.

Street Pavements in English and Scotch Cities

(Special Correspondence)

The question of city street surfaces, like all other road questions, is continually coming up for discussion throughout the United Kingdom. The traffic carried by city streets may usually be divided into three kinds—heavy, medium and light. The heavy traffic is found principally near the docks, railway stations and in the warehouse districts, and on thoroughfares in these sections granite blocks are generally used for paving. For light traffic, macadam construction is usually considered sufficient. Streets carrying medium traffic generally carry some traffic of all sorts—light and heavy, fast and slow, horse-drawn and motor-driven. Smooth asphalt is most frequently used on streets of this character, although its cost is a serious matter with the average municipality.

When laid on a proper concrete foundation, asphalt in this part of the world costs about \$3.25 per sq. yd., a price which is in excess of that paid for ordinary granite setts. As the usual local authority is limited in the amount it may expend, it cannot undertake such an outlay, and it is, therefore, compelled to do the best it can with the material and resources at its disposal until such time as the ideal road surface shall be introduced. This ideal material must be dustless and noiseless, must possess wearing qualities of no common order and—most important of all—it must be of low first cost.

One inexpensive pavement which has given satisfaction is the invention of City Engineer J. A. Brodie, of Liverpool, and is known as Pitchmac. This pavement consists of broken stone bound with bitumen by the penetration method. In constructing it a course of broken stone is laid to a depth of about 3 ins., rolled dry, and then grouted with hot pitch and sand and again rolled. A second coat of stone, laid to the depth necessary to give the road the required thickness, is then spread, preferably while the bottom layer is still hot, rolled to an even surface, grouted as before but with the addition of a little Portland cement to the grout, and again rolled. The binder used is pitch. A considerable mileage of this pavement has been laid in Liverpool and other cities, and some of it that has been down for about six years is still in good condition and is withstanding heavy traffic. Its cost is about 66 cts. per sq. yd. for a 3-in. pavement and \$1 for a 4½-in. pavement.

Satisfactory results have also been obtained at a less cost with the familiar tar macadam, which has proved satisfactory under the conditions obtaining on streets with moderate traffic. This pavement is constructed by putting down a course of 2-in. or 2½-in. tarred stone, rolling it and then applying a second course of the same material, broken to ¾ in. in size, and rolling this into the voids. On this a final course of ½-in. or ¾-in. tarred chippings is laid and rolled, and a little later the surface is painted with a coat of tar, on top of which fine dust or stone is spread. This produces a roadway, not unlike asphalt in appearance, at a cost ranging from 36 cts. per sq. yd. upward.

A. R. Blewitt, general manager of the Northwest Harvester Co. has donated a split log road drag as a premium at the International Dry Farmer Products Exposition to be held in Spokane, Wash., October 19-26, for the best article, not to exceed 500 words, on the subject, "Why it Pays the Farmer to Build Good Roads."

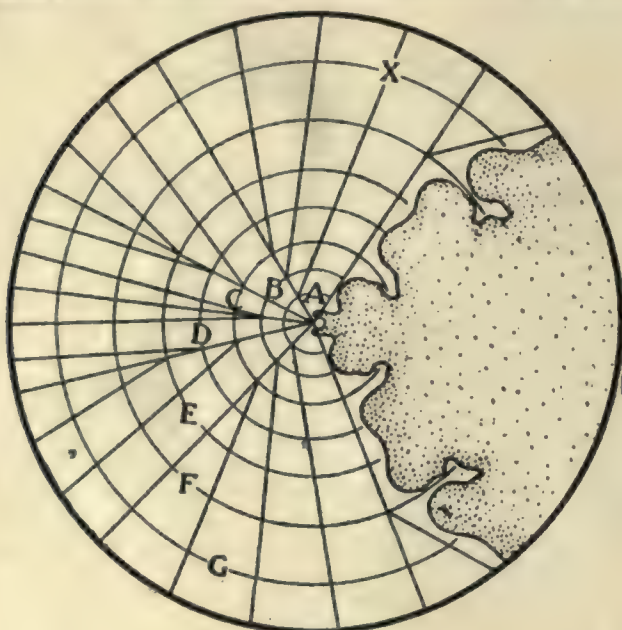


FIGURE 4.

NOTE.—Having indicated the general characteristics of the existing radial thoroughfares, and of the incipient circumferential thoroughfares, it remains to be shown that a combination of these two types of main roads when perfected would afford an efficient system of intercommunication for the district. The diagram shown above indicates in a purely schematic way the combination of a series of radial and circumferential lines comparable with the ultimate development of the existing and proposed thoroughfares of the district, with all local streets omitted. The absence of the more intimate connections which are actually afforded by these local streets places the diagram at a disadvantage, but it suffices to indicate the readiness with which a vehicle at any point, such as X, may proceed to any other points, such as A, B, C, D, E, by a variety of alternative routes. In fact, this combined scheme of radials and circumferentials which the district has been slowly approximating in a wholly unconscious manner during the last two centuries offers a system of intercommunication more direct than that which could be afforded by a rectangular gridiron similar to those which characterize the plans of most American cities. It should be frankly admitted, however, that—in a decidedly minor aspect—a rigid gridiron scheme, like that of San Francisco, Chicago and Philadelphia, has at least one point of superiority over all city plans containing many diagonal lines, like the plans of Washington and Boston, or containing many curving lines, like Paris and Boston. This superiority lies in the fact that strangers may readily find their way in such uniform gridirons. To such strangers the streets of Boston and the Metropolitan district promise forever to be a puzzle, but, on the other hand, these thoroughfares also promise to become more convenient for everyday use, more individual and more free from monotony than any other street system in America.

Good Roads in Durham County, North Carolina

By DR. ARCH. CHEATHAM*

About fifteen years ago, Durham County, N. C., built about one and one-half miles of macadam road, with the result that the people soon saw the benefits of good roads and each year demanded the construction of more of them.

At present the total road mileage of the county is about 700 miles, of which about 400 miles are improved. Of

Board of County Commissioners will erect several steel or concrete bridges.

The standard width for improved county roads is 30 ft., and the maximum grade 5 per cent. The present road force consists of 80 convicts, no free labor being employed. The convicts are divided among five camps, two for con-



PORTION OF THE QUEBEC-MIAMI ROAD.

these 400 miles, 260 are earth roads, 115 are macadam roads, 10 are gravel, and 15 miles have been graded and are being macadamized.

The longest stretch of macadam road in the county extends north and south for 33 miles, the entire length of the county. The portion of this road north of the city of Durham is one of the best in the state. There are, on this road, eight reinforced concrete bridges and one steel bridge, and on other roads in the county there are five steel bridges. It is expected that during the present year the

*Chairman, Good Roads Committee, Commercial Club of Durham, Durham, N. C.



BRIDGE ON THE QUEBEC-MIAMI ROAD.

struction and three for repair work. More attention is being given at present to repairs and maintenance and the use of bituminous binders has been ordered on some of the repair work to be undertaken. The county has in use on road work 36 horses and mules, 2 rock crushers, 2 road rollers, 2 traction engines and other equipment.

During the year of 1911 the county spent \$62,420.82 on road and bridge work. The county has no road bonds outstanding nor any under consideration, the road funds being raised by a tax of 20 1-3 cts. on each \$100 property valuation. In 1910 the increase in valuation amounted to \$1,500,000, and in 1911 to \$1,700,000.



ENO RIVER BRIDGE, DURHAM COUNTY, N. C.—REINFORCED CONCRETE, 350 FT. LONG; 16 FT. WIDE.

A Concrete Pavement in Norwood, Ohio

There has recently been completed on Linden Avenue in Norwood, Ohio, the first concrete pavement to be laid in that city. It is expected by the authorities that this type of pavement will be found to possess many advantages, and if the Linden Avenue pavement and another on Spring Street, the contract for which has recently been awarded, prove as satisfactory as it is hoped, concrete pavements will be used extensively in the new paving work in the city.

the gutter and below the new roadway at the center. The subgrade thus formed was regulated and rolled until compact, and then covered with clean cinders to a depth of 8 ins. The cinders were then wet and rolled, first, with a horse roller and then with a 15-ton Kelly-Springfield steam road roller until compacted to a depth of 6 ins.

A concrete pavement, laid in one course and to a depth of 6 ins., was placed directly upon the cinder foundation.

TABLE SHOWING ESTIMATED COSTS AND CONTRACT PRICES FOR THE LINDEN AVENUE CONCRETE PAVEMENT, NORWOOD, OHIO.

Item	Quantity	Estimated.			Quantity	Contract.		
		Unit.	Cost.	Total.		Unit.	Cost.	Total.
Broken stone or cinders.....	335 cu. yds.....	\$0.75		\$251.25	335 cu. yds.....	\$1.00		\$335.00
Sand.....	60 cu. yds.....	1.50		90.00	56 cu. yds.....	1.50		84.00
Concrete, including grading.....	335 cu. yds.....	5.50		1,842.50	338 cu. yds.....	4.75		1,605.50
Rolling (subgrade and cinders).....	2,000 sq. yds.....	.04		80.00	2,008 sq. yds.....	.02		40.16
Concrete curb and gutter.....	1,350 lin. ft.....	.60		810.00	1,346 lin. ft.....	.60		807.60
Artificial stone walks at intersections....	800 sq. ft.....	.15		120.00	535 sq. ft.....	.10		53.50
12-in. drain pipe.....	80 lin. ft.....	1.00		80.00	107 lin. ft*.....	.75		80.25
3-in. drain tile.....	1,500 lin. ft.....	.03		45.00	1,346 lin. ft.....	.03		40.38
Catch basins.....	2.....	45.00		90.00	4.....	45.00		180.00
Outlet.....	1.....	30.00		30.00	1.....	40.00		40.00
Total Contract Items.....				\$3,438.75				\$3,266.39
Engineering and Superintending.....				137.55				130.65
Printing and Notices.....				173.70				222.96
Total Cost of Improvement.....				\$3,750.00				\$3,620.00
Deduct 2% charged to city.....				75.00				72.40
				\$3,675.00				\$3,547.60
Deduct Cost of Intersections.....				627.00				650.80
				\$3,048.00				\$2,896.80
1,200 front feet assessed at (per ft.).....				\$2.54				\$2.414

*24-in. pipe.

It was determined over a year ago to make the experiment of paving Linden Avenue with concrete, and plans and estimates were prepared for the work by City Engineer J. A. Stewart. An estimate prepared in the spring of 1911 placed the cost, including grading, draining and building curbs and gutters, at \$3,750 for a roadway 30 ft. wide between curbs and 600 ft. long, thus making the total cost per square yard of pavement, 27 ft. 4 ins. wide, about \$2.06 per sq. yd. After some delay the necessary ordinances were passed, and on Oct. 9, 1911 a contract for the work was awarded to Geo. Murdock, of Norwood. The items, quantities and costs are shown in the accompanying table.

In the construction of the pavement the roadway was first excavated to a depth of 12 ins. below the grade of

the concrete used being a 1:2½:5 mixture. The stone used was washed crushed bowlders, varying in size from 1½ ins. to ½ in., and the cement was Lehigh and Old Dominion. The concrete was mixed in a Milwaukee mixer, and, with a force of 15 men, about 70 yds. of concrete were laid per day.

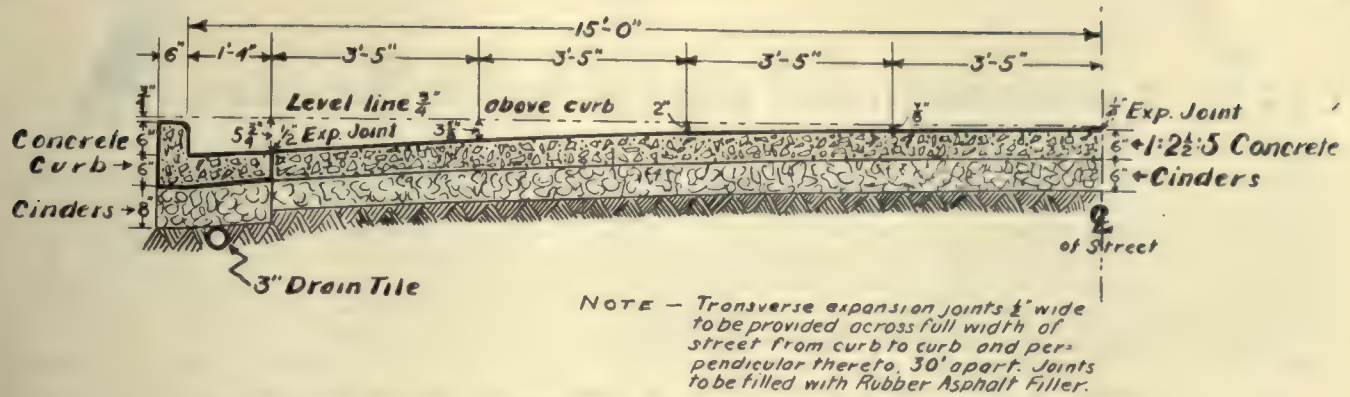
The surface of the concrete was struck off to grade by means of a wooden templet, covering one-half of the width of the street and guided at the sides of the road by the curbs and at the center by a 2-in. by 6-in. strip set to the grade of the center of the pavement and held in position by stakes. The details of the templet are shown in one of the accompanying illustrations. One-half of the width of the pavement was built at a time, a ¼-in. expansion joint



LAYING CONCRETE, LINDEN AVE.—SHOWING CONCRETE CURB AND MIXER.



LAYING CONCRETE, LINDEN AVE.—SHOWING USE OF TEMPLAT.



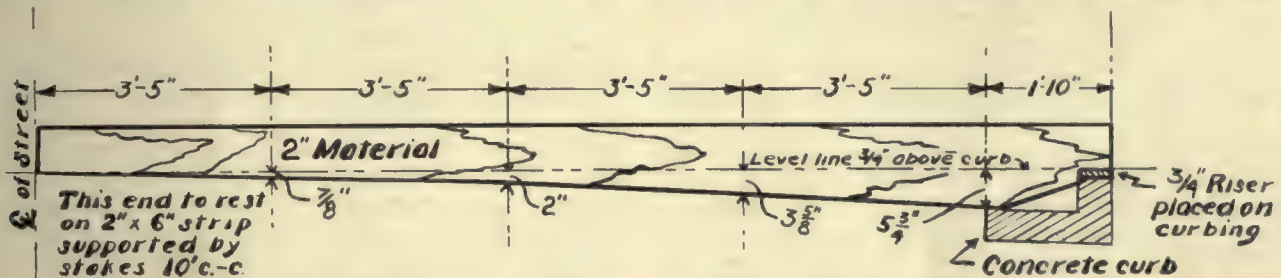
HALF CROSS SECTION OF CONCRETE PAVEMENT, LINDEN AVE., NORWOOD, OHIO.

filled with Carey's Elastite Paving Joint being left at the center. Longitudinal expansion joints of the same character, but $\frac{1}{2}$ in. wide, were left at each gutter, and transverse expansion joints, $\frac{1}{2}$ in. wide, were provided across the full width of the street from curb to curb at intervals of 30 ft. Details of the construction, including the concrete curbs and gutters and the drainage provisions, are shown in the accompanying half section of the street.

After the completion of the pavement the surface was covered with a layer of sand 1 in. deep, which will be left

with tar binder, and 80 cts. per sq. yd. for water bound macadam. Taking into consideration the small difference in the cost of the original construction and the fact that the concrete will entail practically no maintenance charges, it is believed that concrete will prove considerably cheaper in the end than either of the other kinds of surfacing. Concrete has been used extensively in Norwood for curbs and gutters and has given uniformly good results.

The Linden Ave. pavement extends from Park Ave. to Robertson Ave., and, as stated, has a length of 600 ft.



SKETCH OF TEMPLAT USED ON LINDEN AVE. CONCRETE PAVEMENT.

until washed away. The specifications provide for the shutting off of traffic from the street for at least 30 days after the concrete in the pavement has set.

In commenting on this pavement, City Engineer Stewart states that if it comes up to the expectations concrete will almost entirely displace macadam in future street construction in Norwood. The cost of the pavement, he states, including the preparation of the subgrade, the rolling and the covering of the pavement with sand, has been about \$1.05 per sq. yd., as against 95 cts. per sq. yd. for macadam

The other contract to which reference has previously been made is for the construction of a concrete pavement on Spring St., between Montgomery and Mound Aves., a distance of 1,300 ft. The concrete pavement on this street is to be laid for a width of 18 ft. in the center of the roadway, the remainder of which will be sodded. It is expected that if future increases in traffic and increased real estate values justify it, concrete curbs and gutters can be constructed and the roadway widened, if desirable, without destroying the present concrete pavement.



PARTLY COMPLETED PAVEMENT—SHOWING CONCRETE CURB AND GUTTER.



TAMPING CONCRETE—SHOWING TEMPLAT AND CENTER STRIP.

Construction of the Baltimore Fallsway

Street work which it is hoped will yield large returns on the investment and which is of considerable interest because of its peculiar nature is being done in the city of Baltimore, Maryland, by the construction of what is known as the Fallsway. It consists, essentially, of the enclosing of a stream known as Jones Falls in a conduit, on the top of which will be constructed a boulevard.

Jones Falls is a small stream flowing in a general southeasterly direction through the city of Baltimore and emptying into the harbor near the center of the city. It is normally a sluggish stream and forms virtually an open sewer, which for a long time has been a nuisance and a source of expense to the city. At times, during heavy rains, the stream overflows and spreads out over a considerable portion of the city. The most notable instance of this was on July 24, 1868, when the water rose above the granite walls on either side of the stream making a flood in which several lives were lost and damage amounting to several hundred thousands of dollars was done. Immediately after this the city expended nearly \$2,000,000 in extending the walls and increasing their height. In 1904 the stream again overflowed, and, although no lives were lost, considerable property damage was occasioned.

In 1905, the Sewage Commission made a number of changes in the storm water drains emptying into the falls, and, although there have been a number of extremely heavy rains since then the stream has not overflowed. There was, nevertheless, no surety that other floods would not occur, and agitation for the enclosure of the stream was commenced. This work is now in progress, and will result not only in the removal of an unsightly feature in the center of the city, but will also reclaim a strip of land 75 ft. wide and more than a mile in length. In addition, a storm water sewer

of large capacity will be provided and a smooth, level thoroughfare will be secured leading from the municipal docks through the business section of the city to the railroad stations further north.

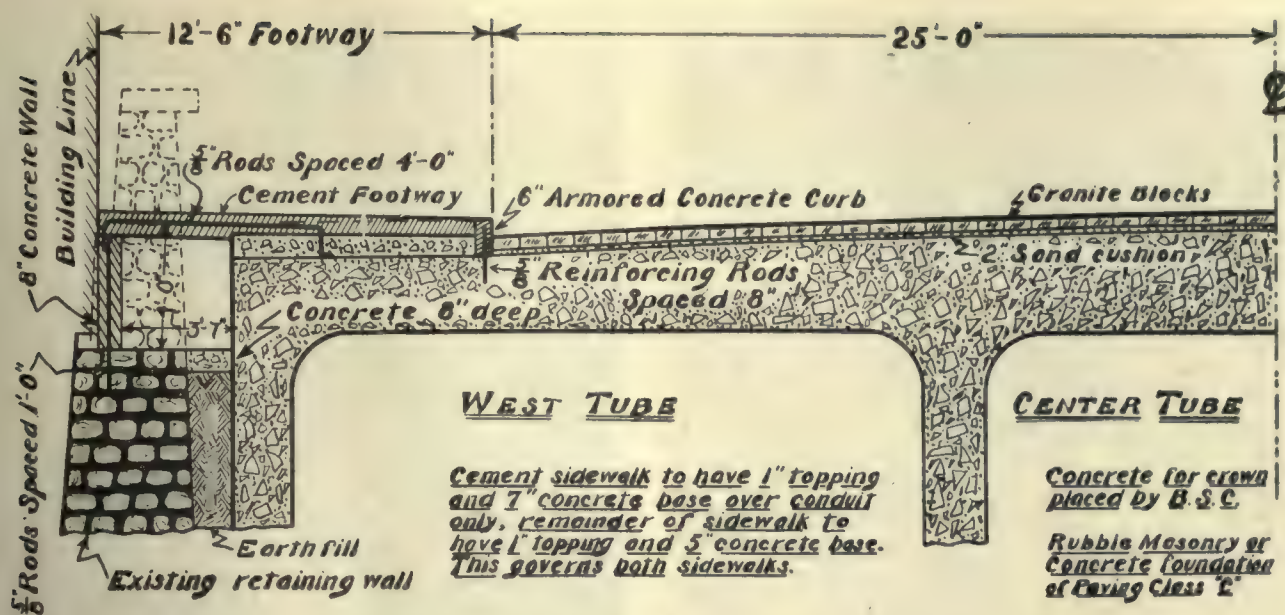
The total length for the conduit is 6,764 ft. It begins in the vicinity of Union Station, with a basin approach a little over 100 ft. in length. From this point there is a single conduit, 28 ft. by 29 ft., extending 1,080 ft. to a junction chamber. From this point, the conduit is divided laterally into three sections, designated as the west tube, center tube and east tube. The east tube is 8 ft. by 14½ ft., and the others 17 ft. by 17 ft. each, for a distance of 1,400 ft., at which point the east tube is enlarged to 15½ ft. by 20 ft. At a distance of 1,300 ft. further downstream, the east conduit is again enlarged to 18½ ft. by 15 ft., the other two tubes remaining the same size. This arrangement is continued for the remainder of the distance to the outlet apron in the harbor.

The construction of the conduits is being carried on by the Elkan-Tuft Construction Co. and by Fisher & Carozza. The contract for section No. 1 was awarded to the first named contractor for \$503,990 and Section No. 2 to the other contractor for \$703,989.50. The contract for the construction of the first section of paving has been awarded to the David M. Andrew Contracting Co. This contract covers about 13,000 sq. yds. of pavement or approximately one-fourth of the total amount to be laid. The pavement will be of granite blocks throughout and will be 50 ft. wide between curbs. There will be 12½-ft. concrete sidewalks on both sides. It is expected that the entire work will be completed by January 1, 1913.

The old granite retaining walls on both sides of the falls have made it impossible to divert the stream, and in conse-



JONES FALLS, BALTIMORE, MD., AT BEGINNING OF WORK—COFFERDAM UNDER CONSTRUCTION IN STREAM.

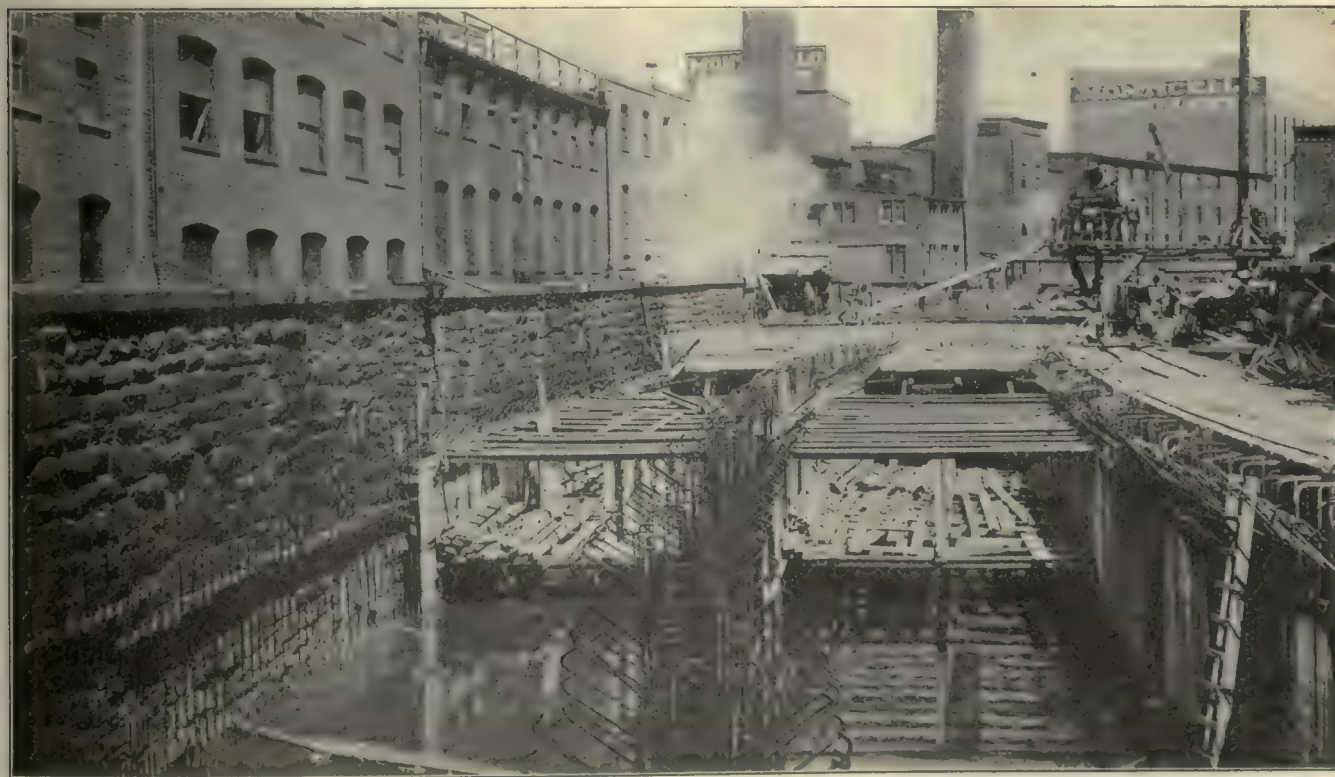


TYPICAL HALF SECTION OF THE BALTIMORE FALLSWAY.

quence it has been necessary to carry on the construction in cofferdams. Heavy rains have caused considerable delay during the work, both by flooding the cofferdams and by washing away material. The retaining walls have been left in place, and the concrete work is being put up between them and entirely independent of them. The concrete walls are 2 ft. in thickness, and the top varies from 27 to 35 ins. in thickness. The vertical reinforcement in the walls consists of $\frac{5}{8}$ -in. square bars, spaced 7 $\frac{3}{4}$ ins. c. to c., and the longitudinal reinforcement of $\frac{1}{4}$ -in. bars, spaced from 2 to 3 ft. apart. The lateral bars in the top are 1 $\frac{1}{4}$ ins. in diam-

eter and are spaced 7 $\frac{3}{4}$ ins. c. to c.; the longitudinal reinforcement consists of 1 $\frac{1}{4}$ -in. bars, spaced $\frac{3}{4}$ in. c. to c. The bottom is reinforced with $\frac{3}{4}$ -in. and $\frac{1}{2}$ -in. bars, the former spaced 15 $\frac{1}{2}$ ins. c. to c. and the latter 12 ins. The east tube has a brick invert, the inverts of the other tubes being of concrete.

The east tube is designed to carry the ordinary flow of the stream and is made smaller than the others in order to keep the water so closely confined that it will pass through with enough velocity to prevent solid materials from settling and so keep the tube clean. As the volume



BALTIMORE FALLSWAY—EAST TUBE COMPLETED.—CENTER AND WEST TUBES UNDER CONSTRUCTION.



VIEW INSIDE OF COFFER DAM—SHOWING WORK ON THE BOTTOM OF EAST TUBE.



COMPLETED EAST TUBE—SHOWING REINFORCING RODS AT LEFT.

of water being discharged increases, it will overflow to the center tube. Should this, in turn, prove insufficient to take care of the discharge, the water will overflow to the west tube, and it is believed that the three will be sufficient to take the water from the heaviest of rains.

Among the advantages which it is expected to secure by the construction of the Fallway are the elimination of maintenance charges for the various bridges that have crossed the stream and a considerable enhancement in valuation of land which, instead of comprising back lots abutting on the open stream, will be transformed into valuable

land facing an important city thoroughfare. It has been estimated that the increased valuation on this land will be great enough so that the increased revenue from taxes on it will pay the interest on the bonds issued for the work and create a sinking fund sufficient to redeem the bonds.

According to a statement issued by R. P. Boyd, Assistant State Highway Engineer of Alabama, 38 miles of model roads will be built in Coffey County with the \$125,000 recently authorized to be expended under the bond system.



BALTIMORE FALLWAY—EAST, CENTER AND WEST TUBES COMPLETED.

Physical Tests of Road Building Rocks

The subject of the physical testing of road building rocks is treated at considerable length in a publication recently issued by the United States Office of Public Roads as Bulletin No. 44, entitled "The Physical Testing of Rock for Road Building," written by Albert T. Goldbeck, Testing Engineer, Office of Public Roads, and Frank H. Jackson, Jr., Assistant, Office of Public Roads. The bulletin is of the regular size of the publications of the office, 6 by 9 ins., contains 96 pages and is illustrated by 20 figures, consisting of reproductions of photographs and drawings of various testing machines.

The bulletin, according to the letter of transmittal from Logan Waller Page, Director of the Office of Public Roads, to James Wilson, Secretary of Agriculture, is partly a revision of Bulletin 79 of the Bureau of Chemistry, a publication which has been out of print for some time, and embodies the results of all tests conducted in the Office of Public Roads since the date of its establishment and in the laboratory of the Massachusetts Highway Commission at Harvard University previous to 1900.

The bulletin is divided into two parts, the first, consisting of about 30 pages, devoted to a description of tests and testing apparatus and the second embodying tables showing the results of tests by Mr. Page for the Massachusetts Highway Commission up to 1902 and those conducted in the Road Materials Testing Laboratory of the Department of Agriculture from the date of its installation in 1902 up to July 1, 1911.

The physical and chemical properties of road materials have been studied in a more or less desultory manner through laboratory tests for over 30 years, according to the introduction to the bulletin. In 1878 a road material laboratory was established in the French School of Bridges and Roads, at which the first systematic attempts to determine the relative values of various rocks for road building by means of laboratory tests seem to have been made. Some of the tests for hardness and toughness, based upon the same principles as those in use today, were developed in that laboratory, and the Deval abrasion test, a modified form of which is now standard in the United States, was also adopted there. Except in France, very little testing of road materials was done in either Europe or America until 1893, according to the bulletin, when the Massachusetts Highway Commission established a road material testing laboratory at the Lawrence Scientific School of Harvard University. In December, 1900, the government established a laboratory for testing road materials in the Bureau of Chemistry of the Department of Agriculture, placing it under the direction of Logan Waller Page, who had previously had charge of the laboratory at Harvard. In 1905 the government laboratory was transferred to the Office of Public Roads. During the past few years many laboratories for testing road materials have been established in technical institutions both here and abroad, and also in the various state highway departments in this country.

Following the introduction in the bulletin are several paragraphs dealing with the destructive agencies acting upon roads. A road surface, according to the bulletin, deteriorates under the action of agencies of three kinds—first, mechanical; second, chemical, and third, physical. The mechanical agencies affecting the road are the various forms of traffic. The impact of horses' feet tends to disturb the individual stones through the loosening of the material which binds them together, while, at the same time, the stones are subjected to an abrasive action which

grinds away their surfaces. A part of the fine material thus produced is blown away by the wind, a part is washed away and a part remains on the road to form new binder. If the amount of this fine material remaining on the road is too great, the road becomes dusty in dry weather and muddy in wet weather, while if too little of it remains, the road disintegrates by raveling because of a lack of binder. Automobiles exert a shearing force of great intensity on the road surface, which, like that exerted by horse-drawn vehicles, tends to loosen the individual stones but, unlike it, lacks the abrasive action which supplies fine material to renew the binder.

The chemical agencies tending toward the disintegration of the road have so little effect that, according to the bulletin, they may be considered negligible. Water exercises the chief chemical action by means of the carbonic acid which it contains and which tends to dissolve carbonates of lime and iron. The acid produced by animal and vegetable decay also acts as a solvent for certain of the rock-forming materials containing magnesia, potash, soda, lime, iron and silica.

In the discussion of the physical agencies, it is stated that although it is probable that the rock used in roads is only slightly affected by frost, yet the effect of repeated freezing and thawing on the road is considerable. This is particularly true, it is stated, in case the road is not well drained, since the absorptive power of the roadbed is usually high even though the absorptive power of the rock used is low. The materials are loosened by the heaving action of the frost and are carried away from the road by the mechanical action of wind and rain.

Since the mechanical agencies are much more powerful as road destroyers than either the chemical or physical agencies, the ability of a rock to withstand mechanical destruction is, according to the bulletin, a good index of its value as a road building material. The three qualities which a rock must have to be suitable for road building are given as hardness, toughness and good cementing power. The hardness of a material is defined as its ability to resist abrasive action, toughness as its ability to resist rupture and cementing or binding power as that characteristic determining how firmly the individual stones will be cemented together by the fine material produced by the action of traffic.

To determine these three qualities as well as to investigate other minor physical characteristics, there are made at the Office of Public Roads, according to the bulletin, tests for hardness, toughness, resistance to wear, cementing value, specific gravity and absorption.

At this point the bulletin takes up the description of the various machines used in the Office of Public Roads, devoting nearly 20 pages to the subject. The hardness test is performed by means of the Dorry machine, in which the hardness of the specimen is determined by the loss of weight due to abrasion. In this machine, a cylindrical core cut from the rock to be tested is held against a revolving cast steel disk under pressure, while standard quartz sand, between 30 and 40 mesh size, is fed on the disk to act as an abrasive agent. At the conclusion of the test, the loss in weight is determined and the hardness calculated from it.

The toughness test is performed in the Office of Public Roads by means of the Page impact machine, an apparatus developed by Director Page, of the office. In this machine the test specimen is held on a hard steel anvil and is subjected to blows from a hammer, which is al-

lowed to fall upon a steel plunger with a spherical end which rests upon the upper surface of the test piece. The hammer is allowed to fall through a distance of 1 cm. for the first blow and through a distance increasing by 1 cm. for each successive blow after the first. This is continued until failure of the test piece occurs, and the number of blows required to cause failure is used to represent the toughness.

The abrasion test, by means of which the hardness, as well as the toughness, of the rock is tested and by means of which considerable valuable information in regard to the wearing qualities of rock has been obtained, is performed by means of a machine of the Deval type, of which previous mention has been made. Briefly described, this apparatus consists of a series of four cast iron cylinders, mounted upon a driving shaft in such a way that the axes of the cylinders are inclined at an angle of 30° with the axis of rotation. The rock is broken into pieces of as nearly uniform size as possible, dried, weighed and placed in the cylinders, which are then revolved at a certain rate for a specified length of time. The weight of material worn off during the test is then determined and the coefficient of wear calculated in terms of the original weight and the loss of weight.

The cementing value of a specimen of rock is determined by means of a test, which, briefly described, is as follows: A sample of the rock to be tested is ground to a fine powder, with water, the resulting "dough" removed from the ball mill in which the grinding has taken place and molded into cylindrical briquettes. These briquettes are placed in an especially devised apparatus known as the Page Impact machine for testing cementing value. In this machine the briquette is placed on end, on an anvil, with a plunger resting on its top. A hammer, actuated by a cam driven at the rate of 60 revolutions per minute, is allowed to deal successive blows on the plunger, falling each time through a distance of 1 cm. A lever, so adjusted that under each blow of the hammer the reaction of the briquette produces a vertical movement in its end, is so attached that its motion is recorded on a piece of paper wrapped around a recording drum. The number of blows necessary to destroy the resiliency of the briquette so that no reaction is recorded on the drum is taken to be the cementing value of the material.

The specific gravity of the specimen is found by weighing it first in air and then in water, in the usual manner. The measure of absorption is obtained from the same sample of stone that is used for the specific gravity test. This sample is kept immersed in water for four days, during which time it attains constant weight. The absorption is expressed in pounds per cubic foot and is calculated from the weight of the specimen in air, the weight of the specimen in water just after immersion and the weight of the specimen in water after immersion for four days.

Besides the machines briefly described as used for each test, several pieces of auxiliary apparatus which are used in connection with the tests are described in the bulletin. These are a core drill used for preparing test pieces for the hardness and toughness tests, a diamond saw used for sawing the cores to the proper length, a grinding lap used in the preparation of the faces of specimens for the hardness and toughness tests, a ball mill used for preparing the "dough" for the cementation test and a briquette machine used for forming the briquettes for this same test.

Following the description of the tests and testing machines employed in the Office of Public Roads, the bulletin takes up the interpretation of tests on rock samples. According to the bulletin, rocks having a coefficient of hardness below 14 are called soft; those having coefficients between 14 and 17, medium, and above 17, hard.

In interpreting the toughness test, rocks running below 13 are called low; from 13 to 19, medium, and above 19, high. The results of the tests for resistance to wear indicate a rock of low value when the French coefficient is below 8, of medium value when it is from 8 to 13, high from 14 to 20 and very high above 20. Cementing values below 10 are called low, from 10 to 25, fair; from 26 to 75, good; from 76 to 100, very good, and above 100, excellent.

The absorption test, according to the bulletin, is of value in judging the probable durability of the rock when subjected to the action of frost. The higher the absorption the greater effect frost may be expected to produce, although in work where bituminous binders are used some observations, it is stated, seem to indicate that it is advantageous to use a rock of high absorption rather than one of low absorption, since, in the former case, the bituminous material appears to penetrate the rock and to act more efficiently as a binder than it would act with rocks of lower absorption. The indications are, according to the bulletin, that the cushioning effect of the bituminous binder renders the rock in a bitumen bound road more resistant to wear than that in a water bound macadam road.

While, according to the bulletin, it is impossible, because of the varying conditions of traffic and climate to which roads are subjected, to give rock samples a numerical grading as a result of laboratory investigations, yet a very accurate preliminary opinion may be formed from the consideration of such results, if taken in conjunction with the probable conditions as regards climate and traffic. The ideal rock for the construction of a macadam road, according to the bulletin, is one which resists the traffic to such an extent as to supply just a sufficient amount of binding material to cement the road. The presence of too little of the fine material indicates that a softer rock should have been used, and the presence of too much fine material that a harder rock should have been used. In the case of a road or parkway carrying a very light traffic, the best results would be obtained, it is stated, not with a hard, tough rock, but with a softer material, having a good cementing value. For the construction of heavily traveled roads, on the other hand, a very hard, tough rock with good cementing value is necessary.

Before attempting to interpret the laboratory tests on samples of rock intended for use in macadam construction there should be taken into consideration the following points: (1) The character of traffic to which the rock is likely to be subjected, whether automobile or horse-drawn, and whether heavy, light or medium; (2) the character of the material under examination, that is, its name and its approximate mineral composition and structure, and (3) the behavior of a material of similar character in actual service.

The bulletin then takes up the various types of rock ordinarily used in road construction, discussing the relation between the laboratory tests and the results obtained in service, according to observation, and indicating the particular class of traffic to which each class of rock is adapted. Experience has shown, it is stated, that, in general, the following table of limiting values for laboratory tests may be used in determining the fitness of a particular rock for use on roads, if taken in connection with the conclusions set forth in the discussion of each particular kind of rock:

Character of traffic.	Results of tests		
	Per cent. of wear.	Hardness.	Toughness.
Heavy	2.5 or less	18 or over	19 or over
Medium	2.5 to 5	14 to 18	14 to 19
Light	5 to 8	10 to 14	8 to 14

In addition to the values given in the table, it is stated

that the cementing value should be over 25 for all classes of traffic except in the specific cases noted later.

Trap rocks, including varieties of diabase, basalt, andesite, gabbro, etc., are, according to the bulletin, particularly well adapted for roads subjected to heavy teaming, because of very high resistance to wear, hardness and toughness. They also produce satisfactory binder providing the traffic on the road is heavy enough to supply sufficient material by wear to replace that lost through natural causes. Except that the low cementing value sometimes found is not apparently borne out in practice, the laboratory tests appear to agree quite closely with the results obtained in practice, it is stated.

Limestone and dolomite are usually distinguished by low resistance to wear and good binding value, and these are usually shown by the results of laboratory tests.

Granites, according to the bulletin, are, as a class, rendered unfit for use except in foundations for macadam roads because of their lack of toughness and binding power. The laboratory tests will usually show these defects, except in the case of a highly altered material, which will invariably show a good cementing value in the laboratory. Experience has demonstrated, however, that even such a material should not be used for surfacing because of the fact that it easily disintegrates under traffic.

Sandstones, when tested in the laboratory, do not yield results agreeing as closely as they should with the results observed in practice, according to the bulletin. This is especially true as regards their wearing and binding qualities, for while tests for these frequently run high in the laboratory it is undoubtedly true, it is stated, that, except in some instances, material of this nature is not

suitable for use except in foundation courses. As a rule, therefore, in judging this material, it is necessary only to determine whether or not it has sufficient strength to stand up under the roller.

Chert is very hard and usually shows good resistance to wear and rather low cementing value in the laboratory, according to the bulletin, although it has been found that, in general, it develops good binding qualities on the road.

Gneiss, schist and slate, owing to their foliated structure, should not be used in road construction where better material is available.

Marble and quartzite are of little value for wearing courses, the marble because of its crystalline structure and the quartzite because of its extreme hardness and lack of binding power.

Road Work in Wicomico County, Maryland

According to a law recently passed by the Maryland Legislature, the office of Roads Engineer has been created in Wicomico County and a tax for road and bridge expenditures has been fixed at a minimum of 20 cts. on the one hundred dollars of assessable property. The term of office of the roads engineer is four years and the salary \$1,800, with an allowance of \$300 for traveling and other expenditures. Under the terms of the present arrangement, the road levy for 1912 will amount to \$25,000.

The accompanying table shows briefly the expenditures for road and bridge work in the county during the period between June 1, 1911, and May 31, 1912.

District	Taxable Basis	Total Expenditure	Labor	Materials	Miscel.	Et. of Lum.	Et. of Pipe	Bus. of Shells
1 Barren Creek.....	\$ 585,054.00	\$ 1,925.01	\$ 1,270.29	\$ 590.72	\$ 64.07	8,656	320	8,000
2 Quantico.....	633,145.00	884.72	540.08	288.29	56.35	5,171	461	-----
3 Tyaskin.....	424,263.00	1,213.87	870.24	389.88	3.75	3,650	150	6,880
4 Pittsburg.....	411,954.00	1,119.97	670.35	427.62	22.00	6,801	2,169	4,500
5 Parsons.....	1,785,218.00	3,732.59	1,343.78	2,332.56	56.25	3,841	229	72,000
6 Dennis.....	193,928.00	1,805.21	1,479.06	307.15	19.00	6,274	460	-----
7 Trappe.....	513,742.00	2,233.44	1,484.53	654.41	94.50	2,388	1,924	3,000
8 Nutters.....	335,126.00	1,464.85	1,058.07	406.78	-----	4,128	320	1,500
9 Salisbury.....	2,127,296.00	2,122.76	483.49	1,623.27	16.00	-----	39	45,000
10 Sharptown.....	356,996.00	80.96	56.38	24.58	-----	937	32	-----
11 Delmar.....	682,664.00	654.26	594.63	32.63	27.00	880	48	-----
12 Nanticoke.....	386,431.00	1,377.26	443.85	933.41	-----	2,051	154	23,769
13 Camden.....	1,202,140.00	190.39	56.00	122.70	11.69	-----	-----	8,000
14 Willards.....	186,835.00	811.27	452.97	349.30	9.00	8,294	612	-----
General Account.....	-----	1,939.20	1,500.00	-----	439.20	-----	-----	-----
Equipment:	-----	-----	-----	-----	-----	-----	-----	-----
Rollers and Sprinklers.....	-----	469.53	-----	-----	469.53	-----	-----	-----
Graders, Scoops, etc.....	-----	126.85	-----	-----	126.85	-----	-----	-----
Salisbury Bridges:	-----	-----	-----	-----	-----	-----	-----	-----
Main Street Draw.....	-----	172.43	100.00	72.43	-----	-----	-----	-----
Humphreys' Mill.....	-----	34.31	-----	34.31	-----	-----	-----	-----
Camden Avenue.....	-----	4.05	-----	4.05	-----	-----	-----	-----
Local Corporation Stock.....	2,203,764.00	-----	-----	-----	-----	-----	-----	-----
Foreign Corporation Stock at 30c.....	1,027,625.00	-----	-----	-----	-----	-----	-----	-----
TOTALS.....	\$13,066,207.00	\$22,412.93	\$12,403.72	\$8,594.09	\$1,415.12	53,071	6,918	162,649

RECEIPTS:

Levy 1911-1912.....	\$16,137.19
State Auto Fund 1910.....	687.68
State Auto Fund 1911 (due).....	1,277.35
Contributions—Collections.....	168.29
Deficit for 1912-1913 Levy.....	4,142.42
	<u>\$22,412.93</u>

Quantities of Dust Preventives Yards of Ditching

1 District.....	857 yards Ditching
2 District.....	1,846 " "
3 District.....	8,427 " "
5 District.....	6,040 gals. Asphalt Oil
7 District.....	1,191 yards Ditching
9 District.....	17.15 tons Calcium Chloride
12 District.....	4,622 yards Ditching

H. M. CLARK, Road Engineer.

The Sand-Clay Road

Among the various kinds of road which are being constructed in the effort to make the most of local resources and so secure improved highways at a cost within the reach of the community, the sand-clay road is one of the most important. This is especially true in certain sections of the country, notably in the West and South, where there are many roads composed of clayey or sandy soil, to which sand or clay, as the case may be, can readily be hauled.

According to the figures of the United States Office of Public Roads, as given in Bulletin No. 41 ("Mileage and Cost of Public Roads in the United States in 1909"), the total mileage of sand-clay road in the United States increased from 2,979 in 1904 to 24,601 in 1909. During 1911, according to figures published in the "Annual Review of Road Building in the United States" in this journal for April 6, 1912, the leading states in work of this kind and the mileages constructed in them during 1911 were as follows: Alabama, 107 miles; North Carolina, 604; South Carolina, 996; Virginia, 139, and Wisconsin, 75.

The construction of sand-clay roads may be performed in one of two ways: first, by mixing a proper amount of clay with a sandy soil, and, second, by mixing sand with a clayey soil. What may, perhaps, be considered a third method is employed where a natural mixture of sand and clay is found in the proper proportions and of the right qualities to make a hard surfaced road. In general, however, roads of this kind are designated as top soil roads. The construction of this kind of road was described at length in an article entitled "Top Soil Roads of Clark County, Georgia," by Maurice O. Eldridge of the U. S. Office of Public Roads, which appeared in "Good Roads" for June, 1909.

The character of the materials has an important bearing on the construction of a sand-clay road, and before be-

ginning work the available materials should be carefully examined to determine their characteristics, with a view to ascertaining whether or not they are suitable for the work, and, if so, in what proportions they should be mixed to secure the best results.

The best sand or gravel is sharp and not too fine. It should be of much the same nature as that selected for making mortar, though the best results are obtained when the grains of sand are slightly coarser than those of a sand used for making mortar. The qualities most desired in the clay are plasticity and the ability to slake well when first wet. A clay is plastic when on mixing with water it becomes sticky so that it can be molded or pressed into various shapes which it will retain after it is dry. A lump of clay of this kind, placed in water, will usually keep its form for a long time. There are other clays, however, lumps of which when placed in water immediately fall to pieces because of the very rapid absorption of water into the porous structure of the clay. It can readily be seen that this is an important characteristic to take into account when examining clays for road building.

Another fact that must be borne in mind when selecting a clay is that some clays when wet have too great expansion. These clays when dried out, of course, shrink to an amount equal to the expansion. When used in a road which is alternately wet and dry, this expansion and contraction of the clay will result in the breaking up of the road. Although this difficulty cannot be entirely overcome, care should be exercised to select the clay having the least expansion and to modify the effect of this property of the clay by using less clay in the mixture. A simple and satisfactory test of a clay may be made by wetting the thumb and placing it against a sample of the material. If the clay sticks to the thumb it is safe to assume that the clay



SAND-CLAY ROAD UNDER CONSTRUCTION NEAR COLDSBORO, N. C.

will be satisfactory, while if it does not stick the probabilities are that it will not prove to be a good binder.

The function of the clay in a sand-clay mixture is the same as that of other road binders, that is, it serves to hold together the particles of the aggregate making up the body of the roadbed. The amount of clay used should, therefore, be just sufficient to entirely fill the voids in the sand. An excess of clay will result in separating the individual grains of sand to such an extent that they will be free to move about in the mass and so produce a roadway that will withstand traffic little better than one composed entirely of clay. If, on the other hand, the amount of clay used does not suffice to entirely fill the voids, the road, being deficient in binder, will rapidly disintegrate under traffic.

The exact proportions of sand and clay to use in any given case cannot be stated, since they depend upon the peculiar characteristics of the sand and clay available. A rough approximation of the amount of clay required for a given quantity of sand may be made as follows: Fill two tumblers of exactly the same size, one with the dry sand under investigation and the other with water, and then pour the water into the glass containing the sand until it reaches the point of overflowing. The volume of water removed from the glass originally full can then be taken as a measure of the voids in the tumbler of sand. This can readily be reduced to a percentage basis for use in proportioning the clay and sand in the road.

Drainage, one of the most essential features of a road of any kind, is particularly important in the case of a sand-clay road. If the work consists of the construction of a sand-clay road by the addition of clay to a sandy subsoil, the matter of drainage is usually more easily attended to than in the case of adding sand to a clay subsoil. In either case, however, proper side ditches should be provided and provision made for relieving the ditches of water as soon as possible. In other words, practically the same provisions should be made for draining sand-clay roads as for roads of other kinds, and even greater care should be exercised in the work.

When building a sand-clay road upon a sandy subsoil, the roadbed should be left flat and a layer of clay spread on it to a thickness of from 4 to 6 ins., depending upon the nature of the clay and the amount of sand which it contains. If the clay is very pure and plastic, less is required than if it is lean or sandy. Over this there should be spread a layer of sand, after which the road should be thoroughly harrowed and then brought back into shape. After a heavy rain, it should be again harrowed and shaped.

In constructing a sand-clay road upon a clay subsoil, the subgrade should be shaped to the proper crown and left 4 or 5 ins. lower than the grade of the completed road. The portion of the road to be made of sand-clay should then be plowed to a depth of about 4 ins. and thoroughly harrowed. Sand should then be spread over the surface to a depth of 4 ins. and thoroughly harrowed in, after which another 4-in. layer of sand should be spread and again harrowed.

It may be found, after the completion of a sand-clay road, that there is an excess of clay and that there is a tendency for the surface of the road to become sticky in wet weather and for the clay to ball and cake. In such cases, a thin layer of sand should be spread over the surface. It may be found, on the other hand, that too little clay or a clay of a low binding power has been used, with the result that the road disintegrates in dry weather. In this case, more clay should be added to the road and worked into the surface. After the completion of the road, it should be properly maintained by the use of a drag and by harrowing when necessary. The ditches should be kept free and open, and the same care exercised in the maintenance as in that of other roads.

The quantities of clay which it is necessary to add to a sand subsoil in order to make a sand-clay road and the quantities of sand necessary to add to a clay subsoil for given widths of road are as shown by the following figures, furnished by Dr. Jos. Hyde Pratt, State Geologist of North Carolina.

If the roadbed is 9 ft. wide and on a sandy subsoil and the clay is added to a depth of 6 ins., it will require 880 cu.



A FIRST-CLASS SAND-CLAY ROAD IN FRANKLINTON TOWNSHIP, N. C.

yds. of clay to cover a mile of road; for a 16-ft. road under the same conditions the amount required will be 1,574 cu. yds. If the clay is a first-class plastic clay, free from sand, and only 4 ins. of clay is added, the amount required will be 587 cu. yds. for a mile of 9-ft. road and 1,049 cu. yds. for a mile of 16-ft. road. If the roadbed has a clay subsoil and sand is added to a total depth of 8 ins., 1,173 cu. yds. will be required for a mile of 9-ft. road and 2,085 cu. yds. for a mile of 16-ft. road.

Street Work in Denver, Colorado

A considerable amount of statistical information relative to pavements, sidewalks and other street work in the city and county of Denver, Colorado, is given in a report recently issued by the Board of Public Works. The report is the regular annual report of 1911, covering the year ending December 31.

During the year the total expenditures for public improvements amounted to \$1,688,173.93, of which \$707,213.88 was expended for grading, curbing, curb and gutter and surfacing; \$165,530.78 was expended for paving; \$57,366.23 was expended for sidewalks, and \$69,944.35 was expended for bridges, viaducts and subways. In addition to this, there was expended \$14,413.91 for the improvement of Speer Boulevard, which included the construction of 12,400 sq. yds. of tar macadam pavement at a cost of \$3,567, and also the excavation of 22,656 cu. yds. of materials from the creek for use in grading a portion of the driveway, at a cost of \$5,037.76.

The subjects of pavements, sidewalks and bridges are given considerable attention in the report. Under the head of pavements, each kind is taken up separately and detailed information given as to the amounts laid, the costs and other data of a similar nature. Some of the principal facts relative to the different kinds of pavement are given in the following paragraphs.

Asphalt Pavement.—During the late summer of 1910 a municipal asphalt plant was put in operation in Denver, and since that time the asphalt paving work of the city has been done by the Bureau of Highways. At the close of 1911 there were asphalt paved streets in the city having a total length of 111,012 lin. ft. and a total area of 527,766 sq. yds. On the asphalt paved streets there were 164,375 lin. ft. of sandstone curb, 27,420 lin. ft. of granite curb and corners, and 11,021 sq. yds. of brick gutters. Details of the asphalt paving work done during 1911 by the city with the asphalt plant were given in a previous issue of this journal. ("Operation of the Denver Municipal Asphalt Plant," "Good Roads," April 13, 1912, p. 233.)

Macadam Pavement.—The length of macadam paved streets on Dec. 31, 1911 was 52,185 lin. ft., and the area 205,757 sq. yds. On these streets there were 45,215 lin. ft. of sandstone curb, 1,185 lin. ft. of granite corners, 24,314 lin. ft. of concrete curb and gutter, and 27,062 sq. yds. of brick and stone gutters. During 1911, 7,000 sq. yds. of bituminous macadam pavement were laid in one paving district and 5,500 sq. yds. in another. The total expenditure for the work in these two districts, including, in addition to the laying of the pavement, the grading, curbing, building gutters, laying concrete foundations, etc., was \$47,400.11. In both of the paving districts the work had not been finished at the date of the report.

Amiesite Pavement.—During 1911, a total of \$67,279.43 was expended on the construction of an Amiesite pavement, the contract for which was awarded in September of the previous year. Before 1911, work had been done on this contract to the amount of \$6,125.01. Up to September, 1911, 66,521 sq. yds. of pavement had been laid. This is the only pavement of this type laid in the city.

Sandstone Pavement.—The total length and area of sandstone pavement at the close of 1911 were 24,181 lin. ft., and 108,915 sq. yds. On the sandstone paved streets there were 17,852 lin. ft. of sandstone curb, 8,286 lin. ft. of granite curbs or corners and 11,906 sq. yds. of stone and brick gutters. The total expenditure during 1911 on this class of work was \$3,731.49.

Alley Pavement.—According to the report, there was, on Dec. 31, 1911, a total area of paved alleys amounting to 276,206 sq. yds., most of which was paved with concrete. During the year of 1911 the total expenditure for concrete alley paving was \$47,119.75.

Sidewalks.—At the close of 1911, according to the report, there were in the city and county of Denver sidewalks having a total length of 2,736,454 lin. ft. or 515.33 miles, of which 1,310,885 lin. ft. were of sandstone flagging and the remainder were of cement concrete. During 1911 there were built 112,544 lin. ft. of cement concrete sidewalk in five improvement districts at a total cost of \$57,366.23.

Congress of Municipal Methods

A congress of municipal methods is to be held in Dusseldorf, Germany, from September 23 to 28. The object of the congress is to permit a general interchange of opinions through the discussion of subjects relating to methods of attaining the greatest degree of efficiency in city building and management, including, of course, many matters relating to street work.

The exhibition will be under the protection of Prince August William, of Prussia, and will be in charge of a committee composed of the governor of the Rhine Provinces, the presidents of the different districts and the mayors of the principal cities of western Germany. The exhibition is to be international in character, and the general secretary, through Consul George Eugene Eager, of Barmen, has extended to the American people an invitation to attend.

Dusseldorf itself is known as the "Park City," and is one of the most beautiful and modern cities of western Germany. It is a favorite convention city in that part of the world, and is considered the most successful exhibition center in the German Empire. At the present time, the principal cities of Rhineland and Westphalia are uniting in an exhibition extending from June 29 to October 31. This exhibition is intended to present the industrial, economical and political development of the cities in that section, and is divided into five groups, as follows: City building, hygienic institutions and development, hospitals and care of the sick, house building and the industries of all Germany.

Good Roads Tour in Texas

A good roads automobile tour was participated in by about 100 farmers and ranchers of Texas. It started at Dallas July 21 and ended at San Antonio July 27. The trip was promoted by the Farm and Ranch Journal of Dallas, and the purpose was to impress upon the farmers the importance and value to them of properly constructed highways.

The trip was routed with a view to showing by contrast the difference between a good road and a bad one. It runs through central Texas, and through places where good roads are unknown.

Prizes were offered to the amount of \$1,000, which is to be divided into purses of \$500, \$250 and \$100 for touring cars and \$50 for runabouts. A trophy cup was also awarded to the car coming in first regardless of class. In addition to the above prizes, a number of automobile manufacturers offered special prizes.

Bitumen Bound Roads in England

(Special Correspondence)

At the thirty-ninth annual general meeting of the British Institution of Municipal and County Engineers, held during the second week of July, a number of interesting papers were read on various phases of municipal engineering. One of these was of special interest to road makers. Under the title of "Suggestions Toward a Standard Specification for Bituminous Bound Carriage Ways," John D. Brodie, a well known municipal engineer, submitted some suggestions as a basis of discussion, in the hope that they might be found useful to surveyors having the responsibility for similar work until a more complete experimental knowledge of the properties of materials suitable for road making should be available.

He said that it was his practice to carry out road construction not only departmentally, but also by expert road constructors working under contracts to build certain lengths of road to specifications, and to maintain them subsequently for a certain number of years (usually five) under financial guarantees. Further, he did not confine his invitations for tenders to work in accordance with his own specification only, but also invited skilled and experienced road constructors to submit alternative general specifications prepared by themselves, including any proprietary articles, or special or patented processes with which their methods of construction might be associated—subject, of course, to guarantees for successful completion and maintenance for a period of years. It was obvious, he said, that however desirable it might be to standardize road specifications, regard must always be had to local and other conditions requiring special consideration and treatment. No hard and fast rules applicable to roads in every part of the country, or, indeed, in every part of the same district, could be laid down. Thus, roads running east and west would require somewhat different treatment from those running north and south, and roads closely hemmed in by trees from those in open country. The nature of the subsoil, the gradients, the rainfall, the direction of the prevailing winds, and, above all, the suitability of the local materials of construction and maintenance, would all require most careful consideration if the best results were to be attained. The nature and amount of traffic likely to pass over the road were among the first things to be ascertained. He urged that traffic should always be expressed in tons per annum per lineal yard of width of roadway, and, further, that for convenience a "scale of traffic intensity" should be agreed upon, on somewhat similar lines to the "scale of hardness" for water or minerals.

The contractor must excavate or fill in the site of the road so as to form the subgrade to the proper level and contour of the foundation, and must thoroughly water and roll with a 10-ton steam roller before laying the hand-packed rubble. One or more longitudinal subdrains must be laid, if required, where the subsoil was of an impervious nature, such as clay, peat, or other water carrying material. Such drains should consist of butt-ended drain tiles, 3 ins. in diameter, laid in trenches 2 ft. 6 ins. deep, and must be connected with the ditches. After the tiles were laid the trenches should be filled up with sand, gravel, or other open or porous material.

The foundation should consist of hand-packed rubble stone, preferably sandstone, carefully selected. The stone must not be less than 7 ins. in depth, from 5 to 9 ins. in length, and from 3 to 6 ins. in width, laid on edge to the finished profile, the stones being laid lengthwise across the roadway. The interstices must be thoroughly "blinded" with any of the following materials: Broken concrete, broken sandstone, or, especially hand-picked clinker. The whole must then be thoroughly watered and rolled

with a 10-ton steam roller; afterward the larger pieces of packing must be picked out, rebroken, respread and watered and rolled again to the proper profile. This process must be repeated until the surface had the appearance of a well rolled macadam road. The depth of the foundation when the rolling was completed must be not less than 7 ins.

The tar asphalt macadam should be made with white or gray limestone, or other stone, from a quarry approved by the surveyor. The stone should be broken and gauged to three sizes, viz., not less than 60 per cent. to $2\frac{1}{2}$ ins., not more than 30 per cent. from $2\frac{1}{2}$ to $1\frac{1}{2}$ ins. and 10 per cent. to $\frac{3}{4}$ or $\frac{1}{2}$ in., all below $\frac{1}{2}$ in. being discarded.

The tar, pitch and tar oil used should conform strictly to the British Road Board specifications. The whole of the broken stone must be thoroughly dried, all dust removed, and heated to about 220° F. before being covered with the tar, and the mixing must be done under cover. From 9 to 12 gals. of tar should be used to one ton of broken stone, the tar being applied to the broken stone at a temperature of from 260° to 280° F. as taken in the tar boiler. Mixing must be done in an approved mechanical asphalt mixer while the stone was dry and heated, and should be continued until the entire surface of every stone was covered with tar.

The respective sizes of broken stone, immediately after mixing with the tar, should be spread, leveled and rolled with a 10-ton steam roller in separate layers; the 2-in. stone as a bottom layer, the intermediate layer of $1\frac{1}{2}$ -in. stone and the top dressing of $\frac{1}{2}$ -in. chippings. The total thickness should be, on all parts of the surface of the road, not less than $4\frac{1}{4}$ ins., after the rolling was completed and the surface brought up to the required contour.

Within two months of the completion of the carriage way, and after it had been used by the traffic, the surface should be carefully cleansed, and afterward sprayed with boiling tar, and gritted with granite chippings gauged between $\frac{1}{4}$ -in. and 1-16-in. square meshed screens, to the extent of one ton of chippings to each 300 to 350 sq. yds. of road surface.

Motor Vehicles in British Columbia

Up to June 15 the official number of licenses for automobiles in British Columbia was 3,800, according to Consul E. A. Smith, of Victoria, in a note in the "Daily Consular and Trade Reports." Of this total number, 320 licenses had been cancelled, and, taking account of this and including 100 on the license books of suboffices, the total number of automobiles actually registered would be, it is estimated, 3,580. In Victoria there were 1,005 licensed automobiles and 34 motorcycles, according to an official list published on June 22. The city has a population of 60,000, and the expenditure for the machines was estimated at about \$3,000,000, making a per capita expenditure for automobiles of \$50, which is believed to be larger than that of any other city in Canada.

To Bridge Pearl River in Mississippi

At a recent meeting of the Hinds County Board of Supervisors at Jackson, Miss., it was decided to instruct the county clerk to advertise the board's intention at the August meeting, to issue additional bonds in the sum of \$100,000 to build a bridge jointly with Rankin County over the Pearl River above Jackson, and of further improving the roads of the first district of Hinds County. This will make a total of \$300,000 recently issued by the supervisors for good roads; \$200,000 has already been spent. The material being used is gravel.

GOOD ROADS

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MASSACHUSETTS ROADS

During 1911 there were completed in the state of Massachusetts 40.37 miles of state highway, of which 9 miles were included in contracts that had held over from the previous year. This mileage comprised roads of six different types, which, as set forth in the first article in this issue, were as follows: Gravel, 5.37 miles; gravel with a top surface bound with bituminous binder, 3.93 miles; sand bound with oil, 4.57 miles; water bound macadam, 7.77 miles; water bound macadam on which an oil surface was applied, 14.61 miles, and bituminous macadam, that is, macadam in the top course of which bituminous binder was incorporated by the penetration method, 4.07 miles.

An examination of these figures brings forth some interesting facts regarding the methods of construction followed by the Massachusetts State Highway Department. Of the entire mileage, 27.23 miles, or approximately two-thirds of all the roads, were built using bituminous material in some way. At the same time, there were only 8.05 miles, or practically 20 per cent., which were, strictly speaking, bitumen bound roads, the remainder on which bituminous materials were used being built without bitumen and then given a bituminous surfacing after completion. In the case of none of these roads was the mixing method employed nor did bituminous material, when used, extend through the depth of the road.

In this column, in the issue of June 1, we called attention to the growing use of bituminous materials in surface applications, citing at that time the practice of the Los Angeles County (Cal.) Highway Commission and of the Massachusetts State Highway Commission. The statement is frequently made that the day of the water bound macadam road is past and predictions made that future work in the building of highways outside of towns and cities will consist of the construction of bitumen bound roads of one kind or another. Of late, however, there has been noticeable a tendency on the part of some road builders to return to the older methods of construction, modified by the use of bituminous material in the wearing surface or as a surface application. Some have even gone so far as to predict a return to the plain water bound macadam road, and in this connection it may be noted that about 7 3/4 miles of road of this type, comprising approximately one-fifth of the total mileage of state roads completed, were built by the State Highway Department of Massachusetts last year.

While these tendencies should be noted by engineers and given due consideration, it will probably continue to be the opinion of most road builders that asphalts, tars and oils all have places in road construction. While these materials are of comparatively recent application in the art of road building, they have, nevertheless, been used long enough so that their utility has been amply demonstrated.

Up to the present time, work with them has been largely of an experimental nature—at first to determine whether or not they could be employed advantageously and later to ascertain the best method of utilizing them. If now there is really a tendency on the part of experienced road builders to limit their use to the upper portion or the surface of the road, it represents not a lack of appreciation of their adaptability, but rather a crystallization of practice as regards their use.

DISTRIBUTING THE COST OF ROAD IMPROVEMENT

In the issue of July 6 we called attention on this page to the complexity of the problem of equitably apportioning the cost of city street improvements over the area benefited. A problem of similar nature presents itself whenever any attempt is made to determine how the cost of improving roads outside of cities and towns is to be apportioned.

The several states which grant aid to the counties or towns within their borders for the improvement of roads have adopted various plans for distributing the cost. In practically all of the so-called state aid states a certain definite percentage of the cost is met with money appropriated by the state. In some, for instance, the cost is divided between the state, county and town, and in others between the state and the town alone. In some, plans have been adopted whereby the roads are divided into state, county and town roads and the expense of constructing each class, met in a different manner. It is probable that none of these schemes results in an absolutely just and equitable apportionment of the cost among those who receive the benefits of the improvements. Some roads for which the state bears a portion of the cost of construction

or maintenance may be of purely local utility, and, on the other hand, roads, for the improvement of which the state contributes nothing, may be located on through routes and so used more by the residents of the state at large than by those who have paid for their improvement. A little consideration of the question will demonstrate how difficult it is to arrive at any adjustment which will distribute the burden of cost in exact proportion to the benefits conferred.

This very point furnishes one of the arguments against national aid in road building, for, if it is difficult to properly distribute the cost over a city or a state, what measure of success might be expected to result from an attempt to properly distribute the cost over the entire country?

Consider, for example, a transcontinental route extending from New York to San Francisco in an approximately straight line. This road would pass through about 25 per cent. of the states of the Union and traverse all sorts of country, from the most thickly populated areas to uninhabited deserts. The traffic on the road would vary as much as the nature of the country and would vary both in amount and in character. The road, as a whole, would be used as a through route and different sections of it would serve as through routes between different points along its line, forming what may, for convenience, be called local through routes. These would overlap, and several of minor importance might often be included in one of the longer sections. Certain sections of the road might be used largely for local traffic by the communities through which they passed while other sections might carry no local traffic whatever.

Each small local community, such, for instance, as a town through which the road passed, should be called upon to bear a certain portion of the expense, which ought to be apportioned among the taxpayers of that town in accordance with the principles applicable to such apportionments within cities. The larger communities, such as the counties or states through which the road passed, should also be called upon to bear their share of the expense. Towns, counties and states not directly upon the line of the road, but whose inhabitants were benefited either directly or indirectly by it, should also pay a portion of the expense, and this payment might take the form of national aid. In each of these cases the amount assessed should bear the same proportion to the total cost as the benefit derived bore to the total benefit.

The foregoing, though touching the problem only upon the surface, should indicate how difficult a task it would be to provide for a just division of the cost should the nation become involved as a factor in defraying the cost of road building. It is manifest that the inhabitants of one state often benefit to a considerable extent by the improved roads in a neighboring state or even in a state at some distance away, and it would also seem likely that the only possible way to provide that such beneficiaries bear their portion of the cost would be through the intervention of some authority beyond the state itself. It is doubtful, however, if by any scheme of national aid any more equitable a distribution of the cost could be obtained than now exists.

THE DEVELOPMENT OF A CITY STREET PLAN

An interesting account of the manner in which the street system of Boston and its environs has been developed is found in an article entitled "The Public Street Systems in the Cities and Towns About Boston in Relation to Private Street Schemes" in another part of this issue. In the article in question, which is a paper presented at the Fourth National Conference on City Planning, by Arthur A. Shurtleff, a Boston landscape architect, the author traces the successive steps by which the streets in Boston and vicinity have been developed from the first thoroughfares established by the early settlers.

Probably few people whose acquaintance with Boston

has been formed by short visits to that city would be inclined to agree with Mr. Shurtleff's characterization of the street system as "admirable." Yet by a careful reading of the paper and an examination of the diagrams accompanying it, one must be convinced that the prime requisite of a street system—facility of communication—is present to a very marked degree. In the last analysis, the efficiency of the street plan of any city is determined by the facility with which traffic may pass from one given point to another given point. Any city that is laid out on a rigid checkerboard system must inevitably lack this requisite, as, except in the case of two points on the same street, traffic from one point to any other point will have to pass around two sides of a right triangle, the hypotenuse of which is a direct line and, therefore, the shortest distance between the two points. As pointed out by Mr. Shurtleff, the principal advantage in the checkerboard plan lies in the ease with which even comparative strangers can find their way about. This, of course, is a minor consideration since the streets of a city are, primarily and principally, for the inhabitants of that city, who may reasonably be expected to be sufficiently familiar with the streets so that they can select the shortest or most available routes without difficulty.

Perhaps the most practical and strongest point made by Mr. Shurtleff is in connection with the private development of real estate. Where these developments are the most frequent, the object of the operators is too often the getting of building sites upon the market in the shortest possible time and obtaining for them the highest prices with the least outlay for improvements. The results of this attitude may be seen in almost any city and are very obvious to a careful observer. When it is decided to develop a tract of land and put it on the market a surveyor in private practice is engaged to make a map of the land and lay out streets in such a way as to subdivide the plot to the best advantage from the standpoint of selling lots. Frequently this subdivision results in a street layout which bears no relation to the street system of the adjoining sections nor to that of the city as a whole. The acceptance of the street layouts by the city is frequently obtained with little difficulty and in not a few cases no attempt is made to establish street or sidewalk grades or building lines before the erection of buildings is commenced. The result of this is that houses are put at any distance from the street and at any elevation above or below what will be the final street grade that the owner may fancy. Later, when the street is paved or curbed, it becomes necessary to establish grades and to avoid local complications, these are frequently adjusted to the abutting property instead of being established with reference to the character of the ground, as they should be.

Even where there is a desire on the part of real estate operators to make their street layouts harmonize with the general city plan, the best results can be secured only when the city itself undertakes the work. Whatever charter provisions or ordinances may be devised to further the assumption of such duties by the city will be steps in the right direction, and unless such provisions are made it is to be expected that American cities will grow without regard to the development of an efficient street plan.

The Ninth Annual Convention of the American Road Builders' Association

The American Good Roads Congress and the Ninth Annual Convention of the American Road Builders' Association will be held in Music Hall, Cincinnati, Ohio, on Tuesday, Wednesday, Thursday and Friday, December 3, 4, 5 and 6, 1912.

Active work on the part of the officers and the committees of the American Road Builders' Association has been in progress for several months and has resulted in the choosing of Cincinnati for the meeting because of the accommodations afforded for the sessions of the convention and for the exhibition which, as usual, is to be held at the same time, and because of the city's accessibility and its geographical location. Plans for the meeting, though by no means completed, have been carefully considered by the committee on arrangements, and it is stated that though no radical departures from the plans followed in previous years are contemplated, it is the hope and expectation of the association to make this convention larger and more successful than even the gathering at Rochester last year.

The exhibition of machinery and materials and methods of construction will be held in Music Hall, in which there is available a floor space of over 50,000 square feet, all of which, it is expected, will be required for the exhibits. In addition to the usual commercial exhibits, there will be set aside this year booths for the several states, and in these there will be shown models of roads, photographs, plans, local road materials and the like. This feature is a logical development of the exhibition idea that has been under consideration for some months, and it will be especially interesting to road engineers and contractors.

The American Road Builders' Association is made up principally of road and street officials, engineers and contractors, and includes in its membership many of the most prominent men identified with highway work in this country and Canada. Its officers are as follows: President, Nelson P. Lewis, M. Am. Soc. C. E., Chief Engineer, Board of Estimate and Apportionment of New York City; first vice-president, Harold Parker, M. Am. Soc. C. E., Ex-Chairman, Massachusetts Highway Commission; second vice-president, J. D. Meriwether, Road Engineer, New Mexico Good Roads Commission; third vice-president, W. A. McLean, Provincial Engineer of Highways of Ontario, Canada; treasurer, W. W. Crosby, M. Am. Soc. C. E., Consulting Engineer to the Maryland State Roads Commission; secretary, E. L. Powers, Editor "Good Roads."

CORRESPONDENCE

Methods of Keeping Cost Data

Editor "Good Roads":

The writer has been a subscriber of your valuable publication since 1908, and has derived a great deal of useful information from its columns. Perhaps, therefore, a suggestion may not be amiss—that what we "small" county road engineers need in a publication of this kind is an exchange of ideas in regard to keeping cost data, such as the statement I am sending you. Can you not give us some information as to simple methods of cost keeping as practiced by fellow engineers? It would be greatly appreciated, I am sure.

Very truly yours,

H. M. CLARK,

Roads Engineer of Wicomico County,

Salisbury, Md.

With Mr. Clark's letter, a part of which is printed above, there was enclosed a statement of road and bridge expenditures in Wicomico County, Maryland, together with some information regarding the passage of a road law by the Legislature creating the office of roads engineer in Wicomico County. This matter is printed on page 63 of this issue.

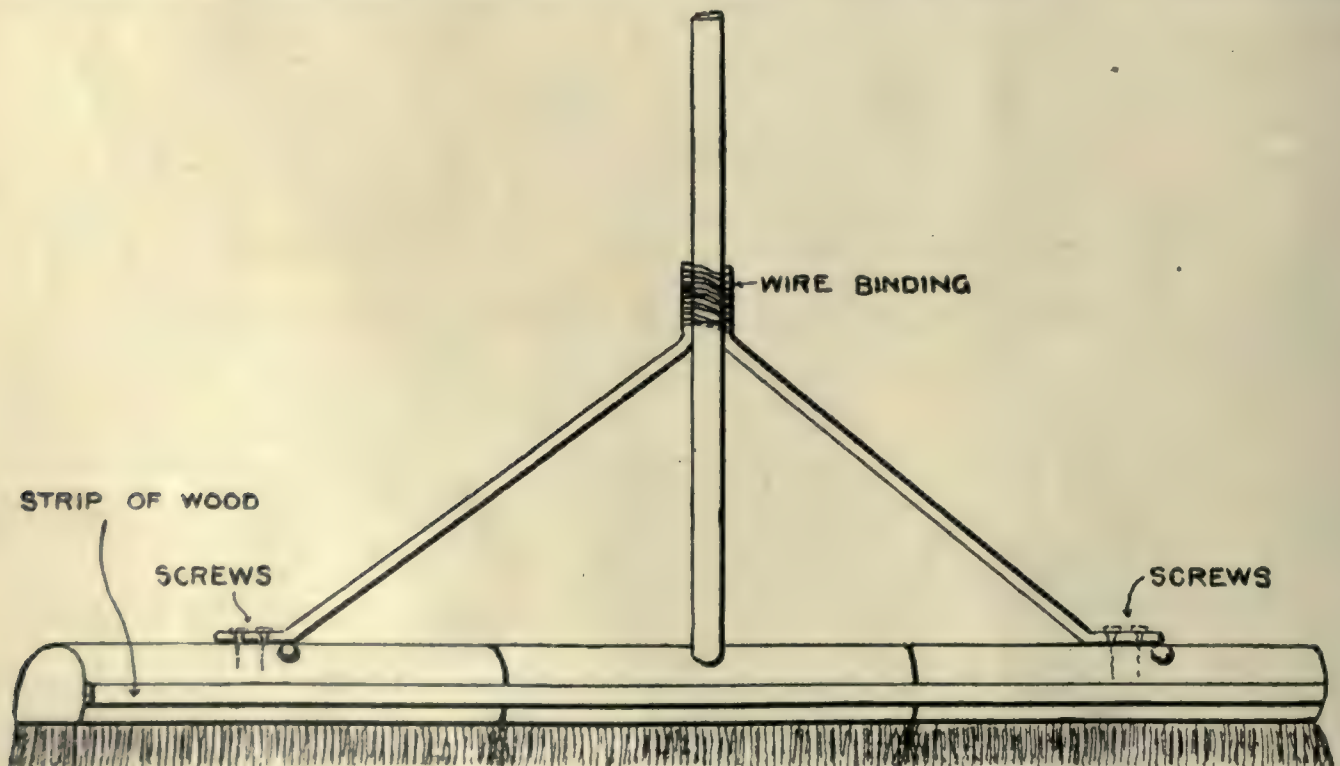
Methods of cost keeping are always of interest to engineers, and it would seem that many of our readers might have ideas on this subject which others would be glad to see published. This journal will be glad to receive and publish any information bearing on this subject which may be forthcoming.

Road Construction in Notts, England

Editor "Good Roads."

I was interested in an article on page 280 of your issue of May 4, entitled "A Proposed Combination Type of Road Pavement," and am sending you with this some particulars of road work as now carried out by me.

I have been successfully making roads of this character for the last four years, with the following slight alterations: The metaled surfaces of the main roads of this county are about 18 ft. in width. It has been shown that the center 9 ft. have to bear the chief part of the severe self-propelled traffic all our roads are now called upon to bear. We, therefore, permanently construct the center 9 ft. with Tarmac and build



"WIDE AREA" BRUSH USED IN NOTTS FOR SPREADING "SIFTINGS."

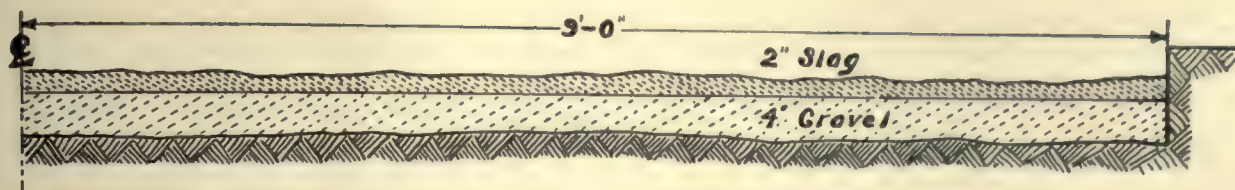


Fig. 1. Typical Section of Ordinary Road Before Improvement.

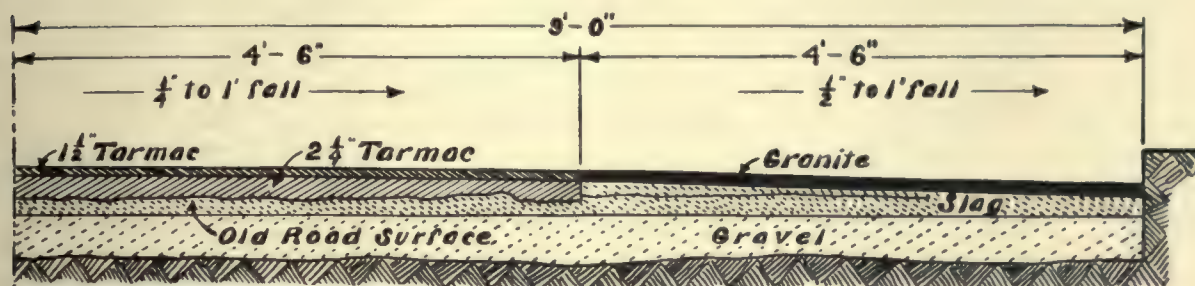


Fig. 2. Typical Section of Road After Resurfacing with Tarmac.

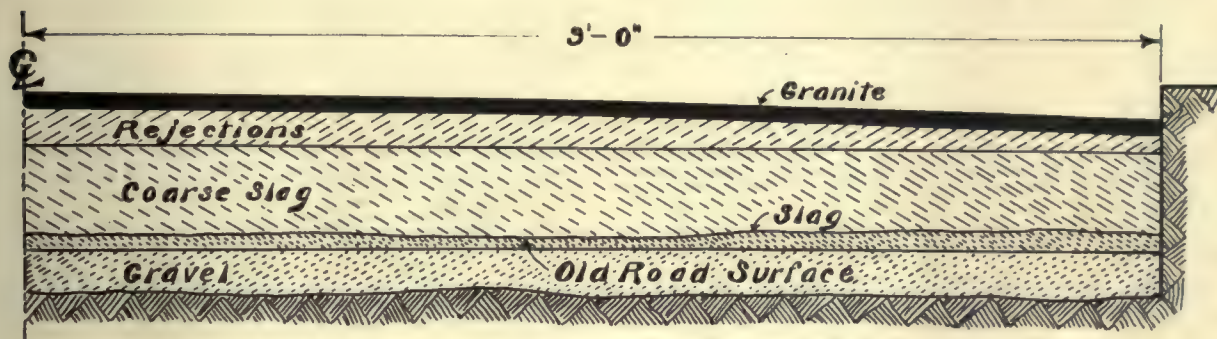


Fig. 3. Typical Section of Road Resurfaced for Heavy Traffic.

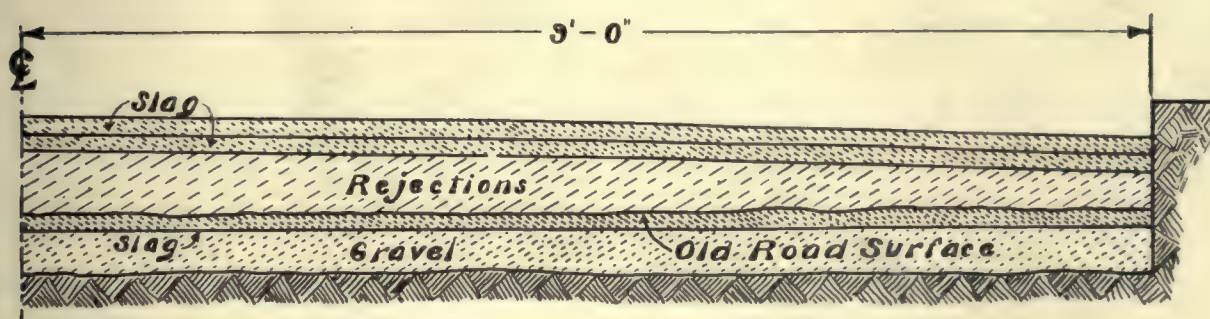


Fig. 4. Typical Section of Road Resurfaced for Medium Traffic.

HALF CROSS SECTIONS SHOWING METHODS OF ROAD CONSTRUCTION EMPLOYED IN THE COUNTY OF NOTTS.
ENGLAND, BY E. PURNELL HOOLEY.

the 4 ft. 6 ins. on either side of the roads with water consolidated slag or granite, living in hope of catching up with the cost of dealing with our centers by the lengthened life of the roads and later being able to deal with the sides.

It is surprising to find that though the center of the roads has to bear several times the traffic that the sides do, the life of the sides is not one-half so long as that of the centers. This is partly accounted for by the fact that the surface water quickly runs off the center and becomes absorbed in the "dry" sides—a strong argument in favor of permanent road construction, which, alas, we have not funds to carry out immediately.

Besides the cross sections of roads, I am also sending a sketch of a simple and cheap way of making a "wide area"

brush. When spreading the "siftings" face upon a tar washed or tar constructed road (it is usual to finish with a dusting of fine, dry material called here "siftings"), it is necessary to get this very lightly and evenly spread over the face of the tarred surface. An ordinary workman with an ordinary brush seems to fail to understand that he must not "lay on," with the result that the "siftings" are heaped and often big patches of the surface are left exposed.

An ordinary bass broom is an important adjunct to a road repairer's outfit. When these brooms get worn down so that only about an inch of bass is left they are generally thrown away, but experience has taught me that when so worn they are in an ideal condition for leveling the surface "siftings," if they are made larger. I have, therefore, adopted the fasten-

ing of three of these old "worn-outs" together and thereby get a tool that prevents scrubbing, draws the material evenly over a larger surface and does the work three times as fast and far better with the same amount of manual labor.

Very truly yours,

E. PURNELL HOOLEY,
County Surveyor of Nottingham.

Surveyor's Office, Shire Hall, Nottingham, England.

The New Bond and the Old

Editor "Good Roads":

In the rush to build roads that will stand the new traffic conditions created by the motor-driven vehicle, it seems as though, perhaps by reason of this very haste, sight had been lost of the cause for the bond in the old style of construction, and that little or no attempt had been made to improve it.

If an opinion were to be formed solely from reading the engineering journals of the moment it would appear that practically all of the thought, investigation and development had been applied to an entirely new and different form of bond. This might be called the inserted bond. It is secured by something that is added to the stone of the aggregate for the purpose of surrounding and binding the separate pieces into place. It is thus a matrix into which the stones are set. In the form as known today, it is weaker than the stone in its resistance to abrasion and more susceptible to the effect of water.

Whether under a trade name or not there are a multitude of such bonds offered, all acting in the one way and all being bitumen in one form or another. An enormous amount of most valuable research work has been done on the bitumens and there is much literature containing data covering the best methods for the determination of the proper quality of the bitumen, together with records of the appliances for and details of the many and varied styles of construction.

Without regard to the merits or demerits of bitumen as a binder, it is a fact that almost no work has been done on the study and possible improvement of the already known bond, although it would seem that the old method had sufficient merit to warrant investigation and study.

It is probably true that the first theory as to the bond of a stone road was, that the interlocking of the stone pieces and the compacting of the finer particles into the voids gave the entire strength. But this is now known not to be the whole truth. Chemistry has made enormous strides since the days of McAdam and Tresaguet, and the fact that chemical changes can take place in a stone through the action of water has been well proved. If there were no other evidence, the well known and almost historic tests of Logan Waller Page, printed in the annual report of the Massachusetts State Highway Commission for 1896, would form a sufficient basis for further investigation.

The few who have given this matter thought, however, have found much corroborative data in other fields. The earlier agricultural chemists recognized the enormous effect of water on the soils and so on through allied branches until the office of Public Roads (United States Department of Agriculture), by the publication of Bulletin No. 23, "The Decomposition of the Feldspars," in 1907, drew further attention to the subject. But in spite of all this, there has been no general recognition by road builders of the possibilities in this direction.

With the exception of one material there has been absolutely no commercial development, and in spite of the really enormous increase of scientific knowledge among road engineers, they almost invariably consider that any water soluble material is valueless for permanent road improvement. In this there lies an error. It is these very watery solutions that have caused the cementation of many rocks, that have brought about the great strength of the oldest known roads and that gave to the water bound macadam its high value, prior to the recent change in traffic requirements. Now if they had this power, is it unreasonable to suppose that it might not be increased or improved to such an extent as to meet the new conditions?

The struggle between the armor plate and the projectile men is not unlike that between the road builder and the road user. But these metal men improved what they had; the road builder has neglected what lay in his hand, and has reached out for something entirely different. Regardless of the merits of the new, it seems foolish to have so quickly cast aside the old which was known to possess elements of value.

It is a fact that water alone, if brought into sufficiently close contact with road stone, as in wet rolling, will produce in varying amounts from different stones an extremely powerful bond. Its formation in the road aggregate is con-

tinuous so long as there is moisture present and the slightest friction or abrasion. It is an efficient and effective bond even for the most severe demands of present day traffic, if it be present in sufficient quantity. However, under the generally used method for creating it, as in the water bound macadam road where it is leached from the stone with plain water, and usually with but little attention being paid as to whether the stone is a good producer or not, its formation is too slow for the compact structure now needed, when the result is obtained only by means of practically pure water.

It does not betoken any great chemical knowledge to suggest or, perhaps, even to prophesy, that if the water contained some of the ordinary impurities common in nature greater quantities of the desired bond might be dissolved in a much shorter time. There are some few recorded tests of the effect of water solutions of these impurities or chemicals on the disintegration or decomposition of rocks, but none that really indicate any work along the exact lines suggested by the road results already known. It is a field that has, as yet, been barely touched if the one chemical road binder now in the market be excepted. The results with that indicate the great possibilities in this line. Some hundreds of miles of road have been treated with it and the effect of this watery solution of several weak organic acids is seen in the increasing hardness of these surfaces. There has been developed, because of it, a system of road construction or treatment that makes an exceptionally smooth surface, free from dust and with the stone aggregate so protected against abrasion as to reduce the resurfacing and annual repair charges to a figure that seems high incredible. Some of these roads are four years old, many of them are three years old, and the total mileage is increasing yearly. The very fact of their existence forms good proof for the claim that the old bond is worth at least the same amount of scientific study as is now being given to the new.

Very truly yours,

J. S. ROBESON.

Au Sable Forks, N. Y.

Portland Cement in Macadam

Editor "Good Roads":

Will you be kind enough to inform me whether "Good Roads" has ever published an article discussing the use of Portland cement in conjunction with rocks employed for road building that have a low cementation index? If you have, I will be obliged if you will kindly send me the paper or give me the reference. I would also like any other references that you may have on the subject.

Thanking you in anticipation of receiving this information from you, I am,

Very truly yours,

J. S. G.

Charlottesville, Va.

No article discussing the use of Portland cement in connection with rock having low cementing value has ever been published in this journal. There have been one or two instances, however, where some such use of cement has been made. During 1909 the State Highway Department of Ohio constructed a number of experimental sections of road on Nelson Ave., near Columbus. An account of this work was published in "Good Roads" for June, 1910, and one of the sections on which Portland cement was used in connection with stone was described at that time as follows:

"On section 12 the treatment was practically the same as on the waterbound macadam road, except that Portland cement was mixed with the screenings in the proportion of 1 to 6. The mixing was done by hand and the binder spread with a shovel. The rolling and watering was continued until a wave of grout was produced in front of the roller. The section was closed to traffic for four days; 15 bbls. of cement were used."

This is the only instance that we have knowledge of in which dry Portland cement was added to the stone in the construction of a macadam road. In 1908, however, a section of road was built in the Borough of Nazareth, Pennsylvania, in which a 1:2 grout was poured on the stone in the macadam course, rolled, and the whole covered with a sprinkling of fine stone.

If any of our readers have knowledge of instances of such a use of Portland cement, we shall be glad to hear of them.

Pressure Sprayer Used in Massachusetts Road Work

The accompanying illustration shows a pressure distributor in operation on a state highway at Chelsea, Massachusetts. Considerable work of this nature has been done on roads in Massachusetts, where pressure distributors have almost, if not entirely, replaced those of the gravity type.

The machine shown is that known as the Pillsbury sprayer and is the invention of Franklin C. Pillsbury, a division engineer of the Massachusetts State Highway Commission. A brief description of the machine was published in a former issue of this journal in the article appearing in the issue of July 1, 1911, describing a distributor demonstration held under the auspices of the Massachusetts Highway Association on the 8th of June, 1911. Briefly described, the machine consists of a tank and distributing apparatus mounted on a truck. This is drawn by a road roller, or traction engine, which supplies steam for heating the material and for producing the pressure by which it is sprayed upon the road. The tank holds 630 gals. and is tested to withstand a pressure



PRESSURE SPRAYER APPLYING MATERIAL AT RATE OF 1½ GAL. PER. SQ. YD.—CHELSEA, MASS.

of 100 lbs. In operation, the steam is turned into the top of the tank and acts directly upon the material forcing it through the spraying nozzles at any desired rate, the rate of application being controlled by means of a valve.

The sprayer is manufactured by Walter Cressy, Gloucester, Mass.

Book Notice

ROADS, PATHS AND BRIDGES. By Logan Waller Page, M. Am. Soc. C. E., Director U. S. Office of Public Roads, Washington, D. C. Cloth, 16vo, 14+263 pp. Sturgis & Walton Co., 31-33 E. 27th St., New York City. 75 cts.

This book is one of a series of similar works designated as the farmers' practical library, of which the general editor is Ernest Ingersoll. According to the introduction by Mr. Ingersoll, the book is addressed to those at a distance from libraries, exhibitions and other means of acquiring information, regarded by him as the principal advantages of living in or near a large city. In the preparation of this book, as well as the others in the series, the general editor states that he has had particu-

larly in view farmers and villagers who are attempting to make the lives of themselves and their families broader and brighter, as well as trying to make material progress. No evil in American rural life, he says, is so great as the tendency of young people to leave the farms and villages for the cities, and the only way to overcome this is to make farm life more attractive. To do this is the object of the books.

The author's introduction states that road building is an art based upon a science, and that though engineering plays an important part in road construction a reasonably adequate working knowledge of the art of road building may be acquired by the layman by observance of the fundamental principles underlying the art. There are times, Mr. Page states, when the farmer finds it necessary to depend upon his own resources in the building of small bridges, culverts and drains, and in such cases a practical knowledge of the simplest theory and practice often makes the obtaining of satisfactory results possible. It is the purpose of the book, he says, to give the fundamental principles of the construction of roads, paths and bridges for farm and neighborhood purposes in a concise and elementary form.

The book contains thirteen chapters, each treating a separate phase of the subject. The first chapter, which takes up 35 pages, treats rather fully of the history of road building from the earliest times of which we have records down to the present. The second chapter deals with the subject of road legislation and administration, and the third with locations, surveys, plans and specifications. The next four chapters discuss earth, sand-clay, gravel and broken stone roads, one chapter being given to each. Chapter 8 treats briefly of the selection of materials for macadam roads, and chapter 9 takes up the maintenance and repair of roads in general, with special sections on the four types of road previously mentioned. The four remaining chapters are devoted to roadside treatment, modern road problems, paths and culverts and bridges.

Asphalt Deposits in Utah

A party of men, including some of the prominent citizens of Utah, recently spent a day in the neighborhood of Sunnyside, in that state, investigating the outcrops of what are said to be extensive beds of rock asphalt, with a view of opening them and developing from them an industry which it is hoped will rank with the most important in the state.

It is said that the members of the party were much impressed with the magnitude of the commercial possibilities of these beds, which comprise a practically unexploited natural resource of the state.

Some of the streets of Salt Lake City have been paved with material taken from these deposits, and it is claimed by those advocating the use of Utah asphalt, that the initial cost of laying the pavement was less than that of foreign asphalt, and that the expense for repairs has been much lower than that on streets laid with other bituminous material.

According to a note in the "Daily Consular and Trade Reports," the Board of Works of the city of San Salvador will receive proposals up to November 15, 1912, for the installation of a complete drainage system for the city and suburbs of San Salvador and for the paving of the streets with asphalt or other suitable material. Proposals for either or both of these undertakings, accompanied by full plans and details, will be received by the "Presidente de la Junta de Fomento," San Salvador.

Program of the Pacific Highway Convention

Arrangements have been practically completed for the third annual convention of the Pacific Highway Association, which is to be held in the St. Francis Hotel, San Francisco, Cal., August 5, 6 and 7. The official program follows:

Monday, Aug. 5, 10 a. m.—Invocation, Rt. Rev. Bishop William Ford Nichols of San Francisco; California's welcome, Lieut.-Governor A. J. Wallace (Acting Governor in absence from state of Governor Hiram W. Johnson); Welcome, Mayor James Rolph, Jr.; Address, "A Transcontinental Highway," John Brisbane Walker, Director of Exploitation for the Panama-Pacific Exposition Committee; Appointment of Committee on Credentials; Appointment of Committee on Resolutions. 2 p. m.—Annual Report of President; Address, A. B. Fletcher, California State Road Engineer; Report of Committee on Credentials; Report of Committee on Resolutions. 4 p. m.—Bay trip as guests of Panama-Pacific Exposition; Committee to inspect Exposition grounds from the water side. 7:30 p. m.—Business Session. 8 p. m.—Presentation of "First to Mexico" medal, and addresses by Chester Lawrence and T. J. Beaudet, with stereopticon views; Account of "First to Hazelton" run with stereopticon views by P. E. Sands.

Tuesday, Aug. 6, 10 a. m.—Address, Hon. Thomas Taylor, Minister of Public Works, "The Roads of British Columbia"; Address, W. J. Kerr, Pres., Canadian Highway Association, "The Canadian Highway." 2 p. m.—Business Session, Committee Reports, and short addresses from delegates. 4 p. m.—Automobile tour of Exposition grounds as guests of Panama-Pacific Exposition Committee and San Francisco Motor Car Dealers' Association; Review of United States troops at the Presidio. 7:30 p. m.—Business session. 8 p. m.—Address, Samuel Hill, with stereopticon views.

Wednesday, Aug. 7, 10 a. m.—Address, Hon. J. N. Gillette, Former Governor of California; Address, J. A. Marsh, President Motor Car Dealers' Association of San Francisco, "The Pacific Highway as a Pacific Coast Asset" (deductions from personal experience). 2 p. m.—San Mateo County on behalf of the State of California entertains the members of the Pacific Highway Association at a Spanish barbecue at San Mateo in celebration of the beginning of first actual construction work on new \$18,000,000 California state highway; cars furnished by courtesy of San Francisco Motor Car Dealers' Association. Informal Jollification—Godspeed.

State Aid Roads in Pennsylvania

Forty-seven counties of Pennsylvania have asked for state aid in the construction of roads, aggregating nearly 740 miles in length, since the so-called Sproul road act became effective. As rapidly as possible, estimates are being made, and the approval of county commissioners and local authorities secured. As soon as this has been accomplished, the State Highway Department will take the steps necessary to award contracts.

It is stated that many applications for state aid on the basis of one-half the cost, as provided by the Sproul law, have not been properly followed up by the officials in the districts where the proposed improvements were asked, with the result that the work of bettering the highways in many sections has been retarded.

Westmoreland County leads the forty-seven in the mileage of roads covered in applications, the total in 16 petitions being 400,120 ft. Beaver County leads in the number of applications made for the improvement of highways and is second to Westmoreland County in mileage, its figures being 26 applications, covering 340,172 ft. The

standing of other leading counties is as follows: Bucks, 20 applications, covering 238,380 ft.; Fayette, 21 applications, covering 210,247 ft.; Butler, 14 applications, covering 209,480 ft.; Green, 14 applications, covering 207,425 ft. Armstrong County has 8 applications for the improvement of 98,000 ft.; Lawrence, 9 applications, covering 78,377 ft.; Mercer, 16 applications, covering 170,000 ft.

Roads Bureau Proposed for Los Angeles, Cal.

The Freeholders' Charter Commission of Los Angeles County, Cal., has agreed on the establishment of a special bureau of county roads as a feature of the proposed new county charter. The plan includes the employment of a highway engineer, who will supervise the construction of the highway system. He is to be paid a salary not to exceed \$500 a month. Under the proposed system, the supervisors are empowered to divide the county into not more than four districts and place each of these under a district superintendent of construction and maintenance.

Proposed Street Widening in Rochester, N. Y.

An ordinance has been introduced in the Common Council of Rochester, N. Y., by Alderman Westbury, providing for the widening of Central Ave. from State St. to Front St. on the south side, so that it will be 66 ft. wide as far as St. Paul St. The ordinance was referred to the Finance and Public Works Committee.

Under the ordinance the widening operations would cut off about 26 ft. of the Savoy and Bristol Hotel fronts and a considerable part of the fire headquarters building near Front St. would be curtailed.

The estimated cost of the improvement is \$200,000, the ordinance providing that it be assessed on the city at large. Commissioner of Public Works Pierce is directed by the terms of the ordinance to negotiate for the land required for the widening, and if he is unable to obtain prices which meet with the approval of the Board of Estimate and Apportionment he is authorized to condemn the land.

Interstate Road Project

The citizens of Dyer County, Tenn., have started a movement for the building of a turnpike between Memphis, Tenn., and Fulton, Ky., and have notified the other counties along the line to cooperate in the enterprise. As planned now, the road will pass through Covington, Ripley, Henning, Halls, Dyersburg, Obion and Union City in Tennessee. The counties through which the road would have to be constructed are Shelby, Tipton, Lauderdale, Dyer and Obion. Fulton, the objective point in Kentucky, is on the state line. The entire distance between the two termini is about 125 miles.

The people of Shelby County, of which Memphis is the county seat, are said to favor the project.

In order to facilitate the finding of books on road building in the public library of Minneapolis, Minn., a list has been printed of the best articles on the subject which are on file in the library. There is said to be a large demand for information on road engineering, street paving and the problem of dust prevention.

At a recent election in the Special Road and Bridge District, of which Sanford, Fla., is the center, a bond issue amounting to \$200,000 was voted. The money will be used to construct 22 miles of brick roads leading out to the farm lands surrounding the city.

Plans are being formulated for the abolition of the grade crossings where the streets of Waltham, Mass., cross the tracks of the Boston and Maine Railroad.

Good Roads on Long Island

A meeting of the Good Roads Committee of Southampton, Long Island, was held on July 19 in the town court-room. Representatives were there from all districts of the town and some from Easthampton, and definite steps were taken to secure better roads throughout the town, to start an appeal to the state with a definite road program for the state's share of the work and to educate the people of that section to the necessity of having good roads and maintaining them, if necessary, at the cost of bonding the town.

There are 325 miles of roads in Southampton, and the appropriation for the present year is \$53,000. In the condition in which the roads are at the present time it is clearly impossible to keep them in order, and a proposition to bond the town for \$400,000, of which one-fourth will be raised in 1912-13 and one-fourth during each of the three following years, was suggested. A committee of five was chosen to ascertain the requirements of the highway law, so that the town could make application to the state for a main state highway on the promise to bond the town to build other roads. Another committee was appointed to report on the best way to present to the State Highway Commission the need of a state road from one end of Southampton to the other and on through Easthampton to Montauk.

Projected Bridge Over San Francisco Bay

It is stated that local and Eastern capitalists are about to engage in the erection of a bridge, 4 miles in length, over a portion of the San Francisco Bay between San Francisco and Oakland, Cal.

It is believed that the bridge, which will involve an expenditure of \$20,000,000, will be well under way by the time the Panama Exposition is held in 1915. It is stated that the consent of the national government is practically assured.

The people of both cities have long desired a change in the conditions which have forced them to take long trips by ferry boat between the two cities. The boats have been constantly crowded since the ferry service was instituted, and it is felt that the growth of population after the opening of the Panama Canal will make this method of communication far from sufficient to meet the demands.

Allan C. Rush, an engineer of Los Angeles, has been studying the problem, and is said to have patented devices which will meet all dangers from storm and earthquake and will prevent swaying.

The Business Men's Association and Col. Biddle, the ranking army engineer officer in California, as well as the War Department, are said to approve of the bridge and the necessary financial backing having been secured, the carrying on of the project is but a matter of awaiting an act of Congress, which is expected at this session.

According to the present plans, eight concrete piers will support the structure by means of ten steel cables twenty inches in diameter. The floor will be 150 feet above water. There will be room for about a dozen railroad tracks, driveways and walks. Each of the cities is to have a third interest in the bridge in consideration of franchises and terminals and the balance of stock is to be held by the backers.

Favor the Abolition of Toll Roads

A meeting of the Norfolk and Princess Anne Free Roads Association was held July 20 in Norfolk, Va.

The primary object of the meeting was to raise funds for current expenses, and the association also adopted resolutions declaring that Norfolk and Princess Anne counties should take over the toll roads.

Tolls have been abolished for the present on the four toll roads, which run through the county, by order of the United States Supreme Court. The toll companies are unable to repair the roads and keep them in good condition, and they claim that the counties should take immediate possession of them.

The Norfolk and Princess Anne Free Roads Association is supported in this fight for the permanent abolition of tolls by the Tidewater Good Roads Association, the Retail Merchants' Association, the Automobile Association and the Princess Anne Roads Association. The officers of the Norfolk and Princess Anne Free Roads Association are as follows: President, J. W. Stebbins; vice-president, W. I. Simpson; treasurer, W. C. L. Williamson; secretary, W. J. Wright; attorney, J. D. Hank.

The Post Roads Measure in the Senate

The post office appropriation bill, which was passed by the lower house of Congress, was reported to the Senate on July 22 by the Post Office Committee.

The Shackelford post roads feature of the bill, which passed the House, providing for Federal improvement of highways, was stricken out in the report to the Senate, and the committee recommended an investigation by a special commission. This recommendation embodies a substitute for the Shackelford measure, providing for the creation of a joint committee, three from each house, to be appointed by the respective chairmen on post offices and post roads. The committee is to be instructed to make a study of the roads question and report to Congress at the earliest possible date.

The original Shackelford proposition was for the payment by the government to different states and localities of stipulated sums, graduated according to the road improvement made by the different states and localities over which rural and state route carriers operate.

It is stated that the War Department has approved the plans for a bridge across the Mississippi River at Memphis, Tenn., and it is thought probable that the bridge will be built in the near future, provided the people of Shelby and Crittenden Counties raise \$50,000 to pay for the approaches. The estimated cost is over \$3,000,000 and it will require two years for its building.

A bond issue of \$74,000, which was recently voted to be expended for paving the streets of Oelwein, Iowa, has been declared invalid. It was claimed that there were flaws in the methods of voting the bids, and an injunction was issued restraining the contractors from going ahead with the work. The bill was taken to the Supreme Court of Iowa and the opinion handed down by the lower court when the injunction was issued was sustained. It is said that the business men of the city are determined that the work of paving shall go on, and it is probable that new bonds will be voted upon.

The leaders of the Boy Scouts of America are encouraging the boys to make roads and are giving them instruction in road building. It is the aim of the directors of the movement to train the boys to be interested in the roads when out on their trips. They are required to observe whether there are ruts in the road and whether the drivers of vehicles make it a point to keep in the ruts. The boys are asked to draw maps of the roads and are supposed to know something about the different methods of construction. They are also required to remove glass and stone from the road, thus decreasing the danger of accidents to automobiles and other vehicles.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. J. E. Pennybacker, Secretary, Colorado Bldg., Washington, D. C.

November 12-15—American Society of Municipal Improvements. Annual Convention, Dallas, Tex. A. Prescott Folwell, Secretary, 50 Union Sq., New York, N. Y.

December 3-6—American Road Builders' Association. Ninth Annual Convention and American Good roads Congress. Music Hall, Cincinnati, O. E. L. Powers, Secretary, 150 Nassau St., New York, N. Y.

General News

Construction of about 30 miles of good roads in the Venus precinct of Johnson County, Tex., will soon be started. Bonds amounting to \$75,000 have been issued for the work.

The first cement paving in western Colorado was recently completed in Granite Junction with the construction of ten blocks in paving district No. 1. The cost was a little under \$120,000.

The Ruggles-Coles Engineering Co. recently sold a portable drying and mixing outfit for road work to Dayton Hedges of Patchogue, L. I. This is the second Ruggles-Coles outfit Mr. Hedges has purchased.

The commissioners' court of Lamar County, Tex., has ordered an election of taxpayers to be held August 17 to vote on the proposition of issuing \$100,000 of bonds for the construction of a section of the proposed Texarkana-Dallas highway.

The good roads department of the Board of Trade of Nashville, Tenn., has started a movement for making September 9-14 'good roads week' in Tennessee. The various organizations throughout the state are being urged to participate in the movement.

Bids were received recently by Director Cooke of the Department of Public Works of Philadelphia, Pa., for the resurfacing of country roads and the repairing of city streets. There is available for this purpose \$754,000, of which \$254,000 is for the resurfacing of country roads and \$500,000 for the resurfacing of city streets. In addition to this, there is the \$500,000 annual payment of the Rapid Transit Company for the repair of streets occupied by its tracks.

A special election will be held in Mesa County, Colo., in August for the purpose of voting on the proposition of issuing about \$300,000 worth of new public improvement bonds, a great part of the proceeds of which will be devoted to highway improvement.

A campaign is being conducted in Pennsylvania looking toward the presenting of a petition to the Legislature asking for an appropriation with which the state may cooperate with New Jersey in the purchase of all toll bridges crossing Delaware River between the two states. An appropriation not to exceed \$500,000 has already been made by New Jersey for its share in the purchase of these bridges.

A good roads association was recently organized in Lawrence County, Ark., with the object of building a pike road between Black Rock and Smithville, a distance of 18 miles. The following officers were elected: President, L. H. Poindexter, Black Rock; vice presidents, Dr. J. W. Morris, Denton, and L. H. Kaiser, Smithville; treasurer, R. C. Martin; secretary, L. N. Walton Roe, Black Rock.

Judge George B. McCallam of Giles County, Tenn., has appointed over 100 citizens, representing the civil districts in the county as a road commission for the county. A meeting of this commission will be held the first Monday in August for organization and other business matters. It is considered likely that good roads bonds will be issued before long for the purpose of buying pikes and abolishing toll gates.

The plans of the Richmond to Washington Highway Association to establishment a route through Caroline County, Va., have received a setback by the rejection by the voters of that county of a \$125,000 good road bond proposition at a recent election. It is now a question of whether the association will change the route of the proposed road so as to avoid Caroline County, or will build the road as originally intended, regardless of the action of the citizens.

The Empire Tours Association has issued a 64-page pamphlet entitled "Empire Tours," describing the Adirondack trail, the Iroquois trail and the Onondaga trail, three New York state motor routes which have become popular during the past few years. The booklet is illustrated with views of various sections of the state through which the trails pass and is provided with a colored motor trip map of the state. The book is being distributed free of charge to automobilists.

A thorough improvement of the Conduit Road from Foxhall above Georgetown, Md., to Great Falls, a distance of about 15 miles, will be started in the near future under the supervision of the engineer officer in charge of the District of Columbia water system. Congress has appropriated a sum sufficient for carrying on the work, including the purchase of machinery which will be used for resurfacing the roadbed and, upon the completion of the work, for keeping the road in good condition.

A distributor known as the Bowlby sprayer, for which a patent has been applied for, has recently been used successfully on three miles of road in the State of Washington under the direction of Henry L. Bowlby, formerly State Highway Commissioner of Washington, and Professor S. C. Lancaster. The machine consists, essentially, of a distributing apparatus, pump and boiler, mounted on a four-wheel truck, which is drawn behind a tank wagon either by horses or by power. The boiler supplies steam for heating coils in the tank wagon, for running the engine, driving the pump and also for small steam pipes inside the distributing pipes by means of which heat can be supplied to the material up to the time it leaves the nozzles.

Personal Notes

H. M. Clark has been appointed Roads Engineer of Wicomico County, Maryland, for a term of four years beginning June 1, 1912.

J. W. Briggs, of the firm of Johnson & Briggs, road building contractors, recently died suddenly at his home in Richmond, Va.

F. N. Holmquist, who has for some time been connected with the engineering department of Phoenix, Ariz., has been appointed City Engineer.

J. B. Justin has received the appointment of Assistant Engineer to the Board of Public Works of Harrisburg, Pa.

Lee Treadwell, Vice President and Chief Engineer of the Union Bridge & Construction Co. of Kansas City, Mo., has resigned.

James E. Barlow has been appointed Principal Assistant City Engineer of Cincinnati, O. Mr. Barlow was formerly engineer with the Bureau of Municipal Research of Cincinnati.

W. R. Davis, chief bridge designer and inspector in the office of the State Engineer of New York, has resigned and will take up private practice. Mr. Davis has held the position with the state since 1899.

CONTRACT NEWS

ROADS AND STREETS

Contracts Pending

Date of letting.	Reported in issue of
8-3 Alhambra, Cal., st. impt.....	8-3
8-3 Racine, Wis., shore protection.....	7-27
8-5 Atchison, Kan., rd. impt.....	7-20
8-5 Orange, N. J., street work.....	7-27
8-5 Hernando, Miss., grading.....	7-27
8-5 Lorain, O., rd. work.....	7-27
8-5 Fullerton, Cal., crushed rock.....	8-3
8-5 Glendale, Cal., street impt.....	8-3
8-5 Jacksonville, Fla., highway impt.....	8-3
8-5 S. Bethlehem, Pa., curb & paving.....	8-3
8-6 New York, N. Y., street impt.....	8-3
8-6 Davenport, Ia., street work.....	8-3
8-6 Bluffton, Ind., gravel rd.....	8-3
8-6 Bass, Ala., road work.....	8-3
8-6 St. Clairsville, O., brick paving.....	8-3
8-6 Oaklyn, N. J., rd. impt.....	7-20
8-6 Scottsboro, Ala., rd. work.....	7-27
8-7 Macon, Miss., rd. const.....	7-27
8-7 Greenville, Ala., rd. work.....	8-3
8-7 Upper Sandusky, O., rd. const.....	8-3
8-7 Santa Ana, Cal., rd. work.....	8-3
8-9 Columbus, O., Highway work.....	8-3
8-10 Houston, Tex., street paving.....	8-3
8-10 Racine, Wis., grading, street wk.....	7-27
8-12 Marion, Ala., rd. work.....	7-27
8-12 Lisbon, O., rd. work.....	7-27
8-12 Rockford, Ala., rd. work.....	7-27
8-12 Chillicothe, Mo., paving, curbing.....	8-3
8-12 Temple, Tex., brick or w. blocks.....	8-3
8-13 Cedar Rapids, Ia., paving & curbs.....	8-3
8-13 Livingston, Ala., rd. work.....	7-27
8-14 Cleveland, O., rd. const.....	7-27
8-15 Sandusky, O., rd. bonds.....	7-27
9-12 Shreveport, La., rd. const.....	7-27

BRIDGES

8-3 Richmond, Va., bridge constr.....	7-27
8-3 Cleveland, O., bridge work.....	7-20
8-5 Monticello, Miss., steel bridge.....	8-3
8-5 Brookville, Ind., bridge.....	8-3
8-5 Rensselaer, Ind., steel bridge.....	8-3
8-6 San Bernardino, Cal., truss b'dge.....	8-3
8-6 Hollidaysburg, Pa., reinf. concrete bridge.....	8-3
8-6 Tampa, Fla., bridge.....	7-20
8-6 Raymond, Miss., bridge and rd. work.....	7-27
8-6 Tampa, Fla., concrete work.....	7-27
8-7 Cartersville, Ga., bridge constr.....	7-27
8-7 Indiana, Pa., reinf. concr. bridge.....	7-27
8-7 Wansee, O., bridge work.....	8-3
8-7 Huntington, Ind., reinf. concr. bridge.....	8-3
8-7 Huntington, Ind., reinf. concrete bridges.....	8-3
8-8 Marion, Kan., reinf. concr. bridges.....	7-27
8-10 Port Huron, Mich., bridge.....	7-20
8-9 Cincinnati, O., bridges and culverts.....	7-27
8-10 Lincoln, Neb., conc. culvert bridge.....	8-3
8-12 New Philadelphia, O., steel bridge.....	8-3
8-12 Houston, Tex., creosoted wood bridge.....	8-3
8-12 Searle, Ala., concrete bridge.....	7-27
8-12 Lawrenceburg, Ind., bridge const.....	7-27
8-16 Cincinnati, O., concrete bridge.....	7-27
9-4 Tallulah, La., bridge.....	7-27

ROADS AND STREETS

Bids Asked and Prospective Work

Alabama City, Ala.—Fifty thousand dollars in bonds have been voted for municipal improvements. Address J. C. Tolson, Pres. of the Council.

Bass, Ala.—Bids will be received by the Court of Co. Cmrs. of Jackson Co. until Aug. 6, at Bass, on the Talley Pike, near Stevenson, Ala., for grading, draining and macadamizing part of the Crow Creek Road.

Gadsden, Ala.—A plan to pave six morae streets at a cost of \$110,000, the fund to be secured through a bond issue, has been submitted to the special committee of the City Council.

Greenville, Ala.—Bids will be received by the Court of Co. Cmrs. of Butler Co. at the Court House, Greenville, until Aug. 7, for grading and surfacing with sand clay twelve miles of state aid road.

Livingston, Ala.—Bids will be received by the Court of Co. Cmrs. of Sumter Co. until Aug. 13 for grading and surfacing with chert three and one-half miles of state aid road. W. S. Keller is State Highway Engr.

Marion, Ala.—Bids will be received by the Court of Co. Cmrs. of Perry Co. at the Court House, Marion, for the construction of four miles of state aid gravel road.

Rockford, Ala.—Bids will be received by the Court of Co. Cmrs. of Coosa Co., Rockford, Ala., until Aug. 12, for grading and surfacing with top soil six miles of road.

Alhambra, Cal.—Bids will be received by the City Clerk until 9 a. m. Aug. 3 on three separate contracts for street improvement. The work consisting of grading, graveling and oiling, cement curbs, gutters and sidewalks, and ornamental lampposts. The three contracts are: (1) Ramona Blvd., estimated cost about \$6,000; (2) Marengo Ave., estimated cost \$2,000 to \$3,000; (3) Cordova St., estimated cost about \$1,200. O. M. Caulk is City Clerk.

Bakersfield, Cal.—The City Trustees have ordered the improvement of B St. from 19th to 24th St. with asphalt pavement and cement curbs and gutters; B St. from 16th to 19th; Maple from H to Oleander; 23d from Chester to L St., with oil macadam pavement and cement curbs and gutters.

W. S. Tevis, of San Francisco, plans putting in about 4½ miles of asphalt paving at his country home at Stockdale.

Corona, Cal.—The City Trustees have adopted resolutions ordering the improvement of E. Olive, Palm Ave., Seventh, Sheridan and Victoria Sts. with oil macadam, curbs, sidewalks and gutters.

Fullerton, Cal.—Bids will be received by the City Clerk until Aug. 5 for furnishing crushed rock for macadam pavement in accordance with specifications prepared by C. Fiske, Jr., and which are on file in the office of the City Clerk. Bids will be received on rock in quantities approximating 32,000 and also 17,000 tons. C. A. Giles is City Clerk.

Glendale, Cal.—Bids will be received by the City Clerk Aug. 5 for improving Penn St. between Pacific Ave. and Columbus Ave. The work consists of about 61,200 sq. ft. of grading and oiling, 1,700 lin. ft. cement curbs, 8,500 sq. ft. 5-ft. cement sidewalk. Also for constructing 1,250 sq. ft. of 5-ft. cement sidewalks along each side of Sixth St. between Central Ave. and Glendale Ave. C. B. Woodberry is City Clerk.

Hemet, Cal.—Riverside Co. has guaranteed \$3,000, half of the estimated cost, the remainder being raised by public subscription, for the construction of a 3-mile boulevard 40 ft. wide around Park Hill and Bolhin Heights.

Inglewood, Cal.—Bids will be received at once by the City Trustees for the improvement of Redondo Ave. The work consists of 247,673 sq. ft. of grading and surfacing with crushed rock and oil, 14,281 lin. ft. of cement curbs, 43,708 sq. ft. of sidewalk and 14,364 sq. ft. of cement gutters. The total length of the improvement is 5,007 lin. ft. Plans and specifications at office of the City Engr.

Oakland, Cal.—The City Council of Oakland has authorized the following street work: Directing City Engr. to prepare plans for the improvement of Nicol Ave. between Peralta and Fruitville Aves.; also plans for the improvement of Grey St. from 35th Ave. to the termination of Grey St.; also to prepare resolutions of intention for sidewalks on various streets.

Ontario, Cal.—The Ontario Land & Improvement Co. will take bids for the paving of a private street known as Commercial Place, from Euclid to Laurel Ave., and the construction of sidewalks, ornamental electroliers and storm drains in Euclid Ave., A and B Sts. Charles Frankish is Pres.

Sacramento, Cal.—The following work was approved by the California State Highway Cmn. at their July meeting, held on July 24th: The survey for the proposed road across the Yolo Basin between Sacramento and Davisville, Yolo Co.; a survey for the proposed road from Redding, Shasta Co., to Coles, near the Oregon line; resolutions under which bids will be solicited for the construction of separate links in the big general routes through Stanislaus, Madera, Fresno, San Diego, Santa Clara and Merced Co., aggregating 69 miles, and estimated to cost about \$400,000. The roads for the construction of which bids will be called are to be located as follows: On general route No. 4, from Sacramento to Los Angeles via the San Joaquin Valley, 11.7

miles in Stanislaus Co., from the Merced Co. line to a point one and one-half miles north of Ceres. Bituminized concrete. High estimate, \$90,000. On general route No. 4, seven miles in Merced Co., from a point one mile south of Califfe to the Merced Co. line. Bituminized concrete. High estimate, \$55,000. On general route No. 4, same as foregoing, 9.5 miles in Fresno Co., from Fresno city to the Madera Co. line. Bituminized concrete. High estimate, \$78,000. On general route No. 4, Sacramento to Los Angeles via the San Joaquin valley, 10 miles in Merced Co., from the north county line of Merced to Arden; bituminous concrete. High estimate, \$80,000. On general route No. 2, from San Francisco to San Diego via Los Angeles, the adoption of an existing roadway between Palo Alto and Santa Clara, in Santa Clara Co., 13 miles long. This is to be repaired and made a part of the state highway system.

San Francisco, Cal.—The Board of Public Works has granted permits for street work at the following locations, the expense to be borne by the property owners: Curbs, asphalt and bituminous pavement on easterly one-half of Sixteenth Ave., 100 ft. southerly from Cabrillo St., to J. J. Dowling Co.; curbs and bituminous pavement on Nineteenth Ave., southerly 100 ft. from Geary St., to City Street Improvement Co.

Santa Ana, Cal.—Bids will be received Aug. 7 by the Bd. of Spvs. of Orange Co. for the construction of Siever's Canyon country road, including bridges and culverts near San Juan Capistrano. The work consists of moving 7,951 cu. yds. of gravel soil, 5,450 cu. yds. shale, 2,219 cu. yds. rock in place; one mile to be cleared of rock and boulders not included in foregoing; 650 lin. ft. of culverts; two bridges costing about \$1,000. W. B. Williams is Co. Clerk.

Santa Ana, Cal.—The Co. Highway Cmn. of Orange Co. has submitted to the Bd. of Spvs. maps and estimates for connecting roads to the state highway. An election for a \$1,250,000 bond issue will probably be called.

Visalia, Cal.—The Bd. of Spvs. is having the Millwood and Badger road surveyed, and will improve it at a cost of \$10,000.

Jacksonville, Fla.—The Co. Cmrs. of Clay Co. will open bids on Aug. 5 for the clearing and grading of 24 miles of the extension of the National highway across Clay Co.

Ocala, Fla.—Bids will be received August 20 for the paving with vitrified brick of that portion of Fort King Ave. on the west side of Main St. Address H. C. Sistrunk, City Clerk.

Chicago, Ill.—The Council is planning to expend \$1,750,000 for improving 12th St. from Michigan Ave. to Ashland Ave. Address City Compt.

Du Quoin, Ill.—The Council is planning to pave many streets throughout the city. Address City Clerk.

Milford, Ill.—The City Council is planning to pave Chicago St. Address City Clerk.

Rock Island, Ill.—Because only one bid was submitted in the 27th St. paving project the Bd. of Loc. Imps. has decided to readvertise for bids.

Waukegan, Ill.—The Bd. of Loc. Imps. will pave many streets here. Address Chmn., Bd. of Loc. Imp.

Bluffton, Ind.—Sealed bids will be received until Aug. 6 for the construction of the proposed gravel road in Harrison Twp., Wells Co. L. A. Williamson is Aud. of Wells Co.

Monticello, Ind.—Bids will be received Aug. 15 for the sale of \$22,000 bonds for the purpose of constructing Christian Blumhardt gravel and stone road in Cass Twp., White Co. Address A. G. Fisher, Co. Aud.

Cedar Rapids, Ia.—Bids will be received Aug. 13 for the construction of combination curbs and gutter. Address L. J. Storey, City Clerk.

Cedar Rapids, Ia.—Bids will be received Aug. 13 for the construction of brick block paving in many streets. Address L. M. Storey, City Clerk.

Davenport, Ia.—Sealed proposals addressed to the Chmn. will be received until Aug. 6 for improvement of Colorado St. from the east line of Farnam St. to the west line of Grand Ave. A. M. Compton, Chmn. Bd. of Loc. Imps.

Davenport, Ia.—Bids will be received Aug. 6 for the construction of 3,000 lin. ft. of concrete paving. Address A. M. Compton, Cmr. of the Bd. of Pub. Works.

Glenwood, Ia.—The City Council is planning to pave Vine St. to Duna.

Iowa City, Ia.—The Council authorized an issue of \$11,312 for paving Evans Ave. Address City Clerk.

Salina, Kans.—Seventh St. and Well Pl. are to be paved, according to action taken by the Council.

Wichita, Kans.—The residents of Third St. and Hillside Ave. have petitioned the Council to pave Third St. Address William Sence, City Clerk.

Faribault, Minn.—The City Council is planning to pave Third St. from the east line of First Ave. Address Mayor Blodgett.

Minneapolis, Minn.—The Bd. of Pub. Works has decided to ask for bids for creosoted block pavement on Snelling Ave. north from University Ave. to the Great Northern right of way.

Chillicothe, Mo.—Bids will be received Aug. 12 for the construction of paving and curbing on Elm St. Address R. L. Bruce, City Aud.

Poplar Bluff, Mo.—The City Council is planning to pave many streets throughout the city. Address City Clerk.

St. Joseph, Mo.—In response to objections to Bermudez asphalt macadam, designated for paving 35th St., Francis to Edmond, the Bd. of Pub. Works has decided upon Trinidad asphalt as the material.

Springfield, Mo.—Preliminary plans for the paving, straightening and widening of a number of streets in the Sixth ward are under consideration and a number of committees to further the work have been chosen.

Binghamton, N. Y.—Upper Court St. and Riverside Drive are both to have brick instead of Bitulithic pavements, as announced last week.

Glens Falls, N. Y.—Bids will be received for the construction of 12,098 sq. yds. of concrete asphalt and vitrified brick pavement. Address Howard M. West, City Engr.

New York, N. Y.—Sealed bids will be received by George McAneny, Pres. of the Boro. of Manhattan, City Hall, until 2 p. m. Aug. 6, 1912, for the following street work: Regulating and repaving with sheet asphalt, close binder, on a concrete foundation, the roadway of Jackson St., between the south side of Monroe St. and the south side of Grand St.; for regulating and repaving with sheet asphalt on a concrete foundation the roadway of Hudson St., from the north side of Barrow St. to the south side of Christopher St.; for regulating and repaving with sheet asphalt, close binder, on a concrete foundation, the roadway of Clarkson St., from west side of Barwick St. to the east side of Hudson St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of Waverly Pl., from west side of Sixth Ave. to Christopher St., and Christopher St., from east side of Waverly Pl. to Grove St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of First Ave., from south side of 26th St. to north side of 28th St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of Third Ave., from north side of 116th St. to south side of 125th St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of Columbus Ave., from north side of 69th St. to south side of 84th St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of Tenth Ave., from north side 50th St. to south side 51st St.; for regulating and repaving with sheet asphalt with close binder on a concrete foundation the roadway of 181st St., from west side St. Nicholas Ave. to east side Broadway; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Tompkins St., from north side Rivington St. to south side 3d St., and Rivington St., from west side Tompkins St. to east side East St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Jackson St., from north side South St. to south side Monroe St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Water St., from east side Burling Slip to west side Rutgers Slip, and Market Slip, from South St. to Cherry St., and Pike St., from South St. to Cherry St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Thomas St., from west side Church St. to east side Hudson St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Greene St., from north side of Blecker St. to south side 8th St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Wooster St., from north side Canal St. to a point 213.4 ft. south of south curb line of Prince St., and from north side Prince St. to south side Blecker St.; for regulating and repaving with special granite block pavement on a concrete foundation the roadway of Fulton St., from east side Broadway to west side South St.; for widening and repaving with Medina sandstone pavement on a concrete foundation the roadway of Second Ave., from south side of 3d St. to the north side of 5th St.; regulating, grading, curbing, flagging, guttering, etc., Hillside Ave., from Broadway to Nale Ave.; for repairing sheet asphalt pavements in the Borough of Manhattan, with work incidental thereto.

crete foundation the roadway of Jackson St., from south side of Monroe St. to south side Grand St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Jackson St., from north side of South St. to south side Monroe St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Water St., from east side Burling Slip to west side Rutgers Slip, Market Slip, from South St. to Cherry St., and Pike Slip, from South St. to Cherry St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Thomas St., from west side Church St. to east side Hudson St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Greene St., from north side Blecker St. to south side 8th St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Hudson St., from north side Barrow St. to south side Christopher St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Clarkson St., from west side Varick St. to east side Hudson St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Wooster St., from north side Canal St. to a point 213.4 ft. south of south curb line of Prince St., and from north side Prince St. to south side Blecker St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Waverly Pl., from west side Sixth Ave. to Christopher St., and Christopher St., from east side Waverly Pl. to Grove St. (253.7 ft. east of east curb line of W. 4th St.); for regulating and repaving with wood block pavement on a concrete foundation the roadway of First Ave., from south side 26th St. to north side 28th St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Third Ave., from north side 116th St. to south side 125th St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Columbus Ave., from north side 69th St. to south side 84th St.; for regulating and repaving with wood block pavement on a concrete foundation the roadway of Tenth Ave., from north side 50th St. to south side 51st St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Tompkins St., from north side Rivington St. to south side 3d St., and Rivington St., from west side Tompkins St. to east side East St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Jackson St., from north side South St. to south side Monroe St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Water St., from east side Burling Slip to west side Rutgers Slip, and Market Slip, from South St. to Cherry St., and Pike St., from South St. to Cherry St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Thomas St., from west side Church St. to east side Hudson St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Greene St., from north side of Blecker St. to south side 8th St.; for regulating and repaving with granite block pavement on a concrete foundation the roadway of Wooster St., from north side Canal St. to a point 213.4 ft. south of south curb line of Prince St., and from north side Prince St. to south side Blecker St.; for regulating and repaving with special granite block pavement on a concrete foundation the roadway of Fulton St., from east side Broadway to west side South St.; for widening and repaving with Medina sandstone pavement on a concrete foundation the roadway of Second Ave., from south side of 3d St. to the north side of 5th St.; regulating, grading, curbing, flagging, guttering, etc., Hillside Ave., from Broadway to Nale Ave.; for repairing sheet asphalt pavements in the Borough of Manhattan, with work incidental thereto.

Sealed bids will be received by the President of the Boro. of The Bronx until 10.30 a. m. Aug. 6, 1912, for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in W. 165th St., from Woodyerest Ave. to Anderson Ave., together with all work incidental thereto; for regulating, grading, setting curbstones, flagging sidewalks, building approaches and erecting fences where necessary in White Plains Road, from a point near Old Union-

port Road to a point near Thwaites Pl., together with all work incidental thereto; for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Fuller St., from Seddon St. to Zerega Ave., together with all work incidental thereto; for completing the contract for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in W. 230th St., from Bailey Ave. to Riverdale Ave., together with all work incidental thereto; for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Fallsade Pl., from Popham Ave. to the change of grade about 100 ft. east of Sedgwick Ave., together with all work incidental thereto; for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary, and paving with granite blocks on a concrete foundation the roadway of E. 168th St., from Clay Ave. to Webster Ave., together with all work incidental thereto (permanent pavement); for regulating, grading, regading and paving with granite blocks on a sand foundation the roadway of Tiffany St., from the northerly side of former Edgewater Road to the dock at the foot of Tiffany St., and setting curb where necessary, together with all work incidental thereto (preliminary pavement); for repaving with granite blocks on a concrete foundation the roadway of E. 133d St., from Alexander Ave. to Willis Ave., and setting curb where necessary, together with all work incidental thereto; for repaving with sheet asphalt on a concrete foundation the roadway of Hoffman St., from E. 184th St. to Fordham Road, and setting curb where necessary, together with all work incidental thereto; for repaving with sheet asphalt on a concrete foundation the roadway of Beaumont Ave., from Grote St. to E. 189th St., and setting curb where necessary, together with all work incidental thereto (permanent pavement); for regulating and regading, setting curbstones, flagging sidewalks and paving with bituminous concrete on a cement concrete foundation the roadway of Manida St., from Lafayette Ave. to Oak Point Ave. (Eastern Boulevard), and adjusting curb where necessary, together with all work incidental thereto (preliminary pavement); for paving with bituminous concrete on a cement concrete foundation the roadway of Marlon Ave., from E. 188th St. to Fordham Road, adjusting curb where necessary, together with all work incidental thereto (preliminary pavement); for repaving with sheet asphalt and granite blocks on a concrete foundation the roadway of E. 183d St., from Arthur Ave. to Southern Boulevard, and setting curb where necessary, together with all work incidental thereto; for repaving with asphalt blocks on a concrete foundation the roadway of Ogden Ave., from Merriam Ave. to W. 169th St., and setting curb where necessary, together with all work incidental thereto; for paving with asphalt block on a concrete foundation the roadway of Belmont Ave., from E. 175th St. to E. 177th St., and setting curb where necessary, together with all work incidental thereto (permanent pavement); for repaving with wood blocks and granite blocks on a concrete foundation the roadway of Southern Boulevard, from Barretto St. to the north side of Westchester Ave., and setting curb where necessary, together with all work incidental thereto; for repaving with wood blocks on a concrete foundation the roadway of 156th St., from Third Ave. to St. Anns Ave., and setting curb where necessary, together with all work incidental thereto; for furnishing and delivering broken trap rock stone and screenings.

Akron, O.—A petition has been presented by the property owners on Miller Ave. asking that that street be improved by grading, curbing with stone and paving with brick.

An ordinance was passed determining to proceed with the improvement of Boulevard St. by paving, etc.

Cleveland, O.—An ordinance has been passed determining to proceed with the improvement of Columbia Ave., north-east from E. 93rd St. to E. 102nd St., by grading and paving.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Cmr., at Columbus, until 11 a. m. Aug. 9, 1912, for grading and paving with a bituminous concrete Sec. No. 3, the Mil-

lersville and Berlin road, State Highway "B" pet. No. 491, in Hardy Twp., Holmes Co.; length, 1,795.5 ft., or 0.34 mile; width of pavement, 16 ft. Estimated cost of construction, \$5,946.52. A draft or certified check for \$300 shall be deposited with each bid. Plans and specifications are on file in the office of the Holmes Co. Cmrs. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Cmrs., at Columbus, until 2 p. m. Aug. 9, 1912, for grading and paving with a bituminous treated water-bound macadam Sec. No. 2, the Leesville road, State Highway "F" pet. No. 387, in Sandusky Twp., Richland Co.; length, 10,800 ft., or 2.04 mile; width of pavement, 12 ft. Estimated cost of construction, \$13,715.40. A draft or certified check for \$300 shall be deposited with each bid. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Department.

Sealed proposals will be received at the office of the Cmrs. of Franklin Co., at Columbus, until 10 a. m. Aug. 9, 1912, for grading and paving with bituminous concrete Sec. No. 3, the Winchester road, State Highway "D" pet. No. 213, in Madison Twp.; length, 11,320 ft., or 2.14 miles; width of pavement, 14 ft. Estimated cost of construction, \$22,044.80. Alternative bids will also be considered for grading and paving with a bituminous treated water-bound macadam. Estimated cost of construction, \$18,190.82. A draft or certified check for \$300 shall be deposited with each bid. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Department.

Resolutions have been passed by the City Council declaring it necessary to make the following street improvements: Grading and paving Engler St., from Pearl to 4th St.; improving Seibert St., from Jaeger St. to Parsons Ave., and Hayes Ave., from Mt. Vernon Ave. to Atcheson St.

Ordinances have been passed providing for the issuance of bonds in anticipation of the collection of special assessments for the improvement of the following streets: Chapel St., from 3rd St. to Lazelle St.; Terrace Ave., from Hudson St. to Arcadia Ave.; Cleveland Ave., from Fifth Ave. to the C. S. & H. Ry.; Parkwood Ave., from Long St. to Clifton Ave.; Eldon Ave., from Broad St. to Steele Ave.; Lincoln St., from High St. to Park St.; Lazelle St., from State St. to Chapel St.; 20th Ave., from Summit St. to the east corporation line.

An ordinance has been passed providing for the issue of bonds to pay the cost and expense of resurfacing, repairing or improving any existing street or streets, as well as other public highways of this city.

Lima, O.—A resolution has been passed declaring it necessary to improve Haller St. by grading and paving.

An ordinance has been passed providing for an issue of special assessment bonds in the sum of \$2,250 for paving Brice Ave., from Metcalf St. to Washington St.

Massillon, O.—An ordinance has been passed determining to proceed with the improvement of W. Tremont St. by paving with vitrified brick paving blocks.

Piqua, O.—An ordinance has been passed determining to proceed with the improvement of Chestnut St. and South Ave. by grading, etc.

St. Clairsville, O.—Sealed proposals will be received at the office of the Commissioners of Belmont Co., at St. Clairsville, until 11 a. m. Aug. 6, 1912, for grading and paving with brick for medium traffic Sec. No. 1, the Belmont National road, State Highway "H" pet. No. 191, in Union Twp.; length, 7,500 ft., or 1.42 miles; width of pavement, 13 ft. Estimated cost of construction, \$18,378.24. A draft or certified check for \$300 shall be deposited with each bid. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Department.

Steubenville, O.—Ordinances have been passed authorizing the improvement of Lake Erie Ave., between Adams St. and South St., by the construction of fire brick pavement with the necessary curbs; the improvement of Alley D, which is the alley between 5th and 6th Sts., from Ross St. to Madison Ave., by the construction of fire brick pavement; improving Court St., from Madison Ave. to Ross St., by the construction of fire brick pavement; improving W. Adams St. and State St. by constructing fire brick pavement; improving Ohio St., from Pennsylvania Ave.

to Bellevue Blvd., by the construction of fire brick pavement.

An ordinance has been passed determining to proceed with the improvement of North St. by the construction of a fire brick pavement.

Toledo, O.—An ordinance has been passed determining to proceed with the improvement of Nebraska Ave., from Junction Ave. to Brown Ave., by grading and paving.

A resolution has been passed declaring it necessary to improve Glenwood Ave., from Central Ave. to Castle Blvd., by grading and paving.

Upper Sandusky, O.—Sealed proposals will be received at the Auditor's office of Wyandot Co. until Aug. 7 for the grading, stoning and tarbinding of a road beginning on South St., in the village of Nevada (Antrim Twp.), from the point of intersection with the Morrison road west to the west line of the incorporated village of Nevada, O. Peter Frank, Jr., Aud.

Connellsville, Pa.—Boro. Engr. Charles R. Hirst has been instructed to prepare estimates for a 6-ft. arched culvert under Race St.

Corry, Pa.—The Council is planning to pave North Center St. Address City Clerk.

Pittsburg, Pa.—The City Council is planning to pave streets throughout the city. Address Director Armstrong.

S. Bethlehem, Pa.—Sealed bids will be received until Aug. 5 for curbing and paving and the repair of curbing and paving in front of properties in the Boro. of South Bethlehem. Francis O. Rankey is Chmn. of Bd. of Pub. Wks.

York City, Pa.—The Council is planning to pave East Market St. between Sherman and Lehman Sts. Address City Clerk Charles P. Shriner.

Bristol, Tenn.—The Virginia half of E. State St., from the railroad crossing to Goodson St., will at once be paved.

Dallas, Tex.—A paving survey of Lancaster Ave., in Oak Cliff, has been started by engineers from the City Eng. Dept.

Houston, Tex.—Bids will be received August 10 for ten miles of street paving. Cost, \$40,000. Address City Clerk.

Temple, Tex.—Bids will be received Aug. 13 for the paving of Central Ave. with brick or creosoted block. Address W. E. Dozier, City Engr.

Waco, Tex.—Ordinances passed by the City Cmrs. for street paving will require an expenditure of about \$125,000. One of the streets to be paved with permanent material is North Fifth.

Beloit, Wis.—The Council is planning to lay cement walks throughout the city. Address John Martin, Clerk of the Bd. of Pub. Works.

Racine, Wis.—Bids will be received Aug. 10 for constructing 323,322 sq. yds. of paving and 480 ft. of curb and gutter. Address P. H. Connolly.

Bids Received and Contracts Awarded

Little Rock, Ark.—The contract for paving E. 3rd St. has been awarded by the Bd. of Cmrs. to E. J. Wetterstrom, of Little Rock.

Alameda, Cal.—Seven firms submitted figures for the construction of the large reinforced concrete bridge which is to be erected at Niles, Alameda Co. The Locks Construction Company was low at \$71,460. Plans for the bridge were prepared by County Engineer Haviland. The unit system of construction will be used. The following is a list of the figures received by the Board of Supervisors: Locke Construction Co., \$71,460; F. Rolandi, \$73,463; Ransome Concrete Co., \$73,993; Foster-Vogt Co., \$74,649.75; Thurston & Co., \$80,676.73; Wilson & Froster Construction Co., \$82,385.05; Oxser & McDonald, \$86,041.

Coronado Beach, Cal.—Bids will be received up to 3 p. m. Aug. 5 by the Trustees of Coronado Beach for grading and paving D Ave., from 1st St. to 7th St.; also for grading and paving 9th St., from E Ave. to K Ave. Tilden Clard is City Clerk.

Fresno, Cal.—The California Road and Street Improvement Co. was awarded the contract at \$19,479.02 for the paving of Merced St. for a distance of six blocks.

Long Beach, Cal.—The Fairchild-Gilmore-Wilson Co. has been awarded the contract for the paving of West Broad-

way and other streets on its bid of paving and grading. Specification A, 15.7c. per sq. ft.; specification B, 17.8c. per sq. ft. for cement curb, 30c. per lin. ft. for cement gutters, 23c. per sq. ft. for sidewalks, 11c. per sq. ft. for culverts; complete, \$365. Aggregate amount, \$50,000.

Orange, Cal.—The Los Angeles Paving Co. was awarded the contract for the paving of 11,000 sq. ft. in the Plaza at 7c. per sq. ft. for asphalt paving.

Glenwood, Ia.—The City Council has awarded the contract for repaving Vine St., from the Public Square to the Burlington Station, to Dunagan & Hamilton, of Shenandoah, Ia., at the following prices: \$1.30 per sq. yd. for brick paving; 57 cts. per running ft. for curb and gutter; 30 cts. per cu. yd. for extra grading, and \$6.75 per cu. yd. for extra concrete work; total, approximately \$11,000.

Wichita, Kan.—The contract for paving the street railway company's right of way from Main St. to the Santa Fe tracks on Douglas Ave., has been awarded by the City Cmrs. to Ritchie & Son, at \$13,000.

Baltimore, Md.—The following contracts for street work have been awarded by the Bd. of Awards, upon the recommendation of the Paving Comm.: Sheet asphalt, Contract No. 20; Filbert Paving & Const. Co., Fidelity Bldg., Baltimore, at \$25,643; vitrified block, Contract No. 24, P. F. Reddington, 321 St. Paul St., Baltimore, at \$7,595; granite block, Contract No. 25, John E. Quinn, 712 St. Paul St., Baltimore, at \$18,885; vitrified block, Contract No. 26, Martin J. Beach, 809 American Bldg., Baltimore, at \$83,472; granite block, Contract No. 27, John E. Quinn, \$56,546; vitrified block, Contract No. 29, Cunningham Paving & Const. Co., 1345 Arch St., Philadelphia, Pa., \$17,711; granite block, Contract No. 30, P. F. Reddington, \$4,585; vitrified block, Contract No. 33, Consolidated Engineering Co., Emerson Tower Bldg., Baltimore, \$24,597.

Towson, Md.—The contract for macadamizing a section of Garrison and North Ave., has been awarded by the Baltimore Co. Highway Comm. to the Elder Paving Co., Baltimore, at \$6,212.

Boston, Mass.—The contract for the construction of 2,100 ft. of oil macadam roadway a tLanslow has been awarded by the State Highway Comm., to Rowe & Walsh, Pittsfield, at \$4,310.

Contract for constructing 2,300 cu. ft. of macadam roadway at Haverhill has been awarded to D. J. Sheehan and J. J. Rourke, of Lynn, at \$4,321.

The contract for resurfacing the roadway of Commonwealth Ave., has been awarded by the Dept. of Wks. to Coleman Bros., of Boston, at \$14,300.

Allegan, Mich.—The contract for constructing about half a mile of brick pavement has been awarded to Carpenter & Anderson, for approximately \$12,000.

Grand Rapids, Mich.—The following bids have been received for street work: Brick paving on Butterworth St., McDermott & Cooper, \$29,740.61; Pickett Co., \$30,591.33; Carpenter & Anderson, \$30,190.39; grading and graveling Hurd Court, H. A. Hoxie, \$833.95 (low bid); grading and graveling E Ave., Fred Gildner, \$1,338.65 (low bid); grading and graveling Minnie St., Bulte-ma Bros., \$4,256.65 (low bid).

Monroe, Mich.—The contract for paving Elm Ave. with concrete has been awarded to the Fidelity Const. Co., of Ann Arbor, Mich., at \$1,331.

Contract for paving 2nd St. with asphalt has been awarded to the Toledo Asphalt Block Co., Toledo, O., at \$35,811.

Sparta, Mich.—The contract for paving Division St. with brick has been awarded to McDermott & Cooper, Grand Rapids, at \$12,423.35. The contract includes a 5-year maintenance clause.

Jersey City, N. J.—The contract for paving Seaview Ave., from Ocean Ave. to Hudson Blvd., with Belgian block has been awarded by the City Council to Van Keuren & Son, Jersey City.

Newark, N. J.—The following contracts have been awarded for street work by the Bd. of Street & Water Cmrs.: Paving Wainwright St. from Hawthorne Ave. to Lyons Ave. with brick, McMahon Const. Co., Newark, \$20,512; paving Runyan St., from Seymour Ave. to Osborne Ave. with granite, McMahon Constn. Co., \$9,109; paving Runyan St., from Seymour Ave. to Elizabeth Ave., with brick, Newark Paving Co., 1st St., Newark, \$23,834; paving Lyons Ave., from Elizabeth Ave. to city line, H. A. McCann, \$23,911; paving So. 20th St., between Springfield Ave. and Clinton Ave., Wm. Ballard, \$9,180; paving Aldeine St., from Lyons Ave. to Edmonde Pl., Chas. Carracino, \$7,528; paving

3rd St., from Bloomfield Ave. to 3rd Ave., Alex. J. Milmo, \$8,032; paving 2nd Ave., from 3rd St. to Roseville Ave., A. J. Milmo, \$6,143.

Westfield, N. J.—The contract for constructing 12,000 sq. yds. of water bound macadam has been awarded by the Town Council to James C. Park, of Cranford, N. J., at \$14,381.

Albany, N. Y.—Contract for improving Ontario Ave., between Western and Central Aves., by constructing pavement and sidewalks has been awarded by the Bd. of Contract & Supply to Benjamin F. Mulderry, 64 1st St., Albany, at \$22,950.

New York, N. Y.—The Dept. of Pub. Wks. has awarded the contract for paving Houston St., from Varick to Hudson Sts., with wood block to the U. S. Wood Preserving Co., at \$6,582.

Contract for paving Northern Ave., from 177th St. to 181st St., with asphalt has been awarded to the Harlem Contr. Co., New York City, for \$11,577.

Murphy, N. C.—The contract for the construction of 22,000 sq. yds. of macadam pavement has been awarded by the Comrs. of Murphy Twp. to the Noll Const. Co., of Chattanooga, Tenn., at \$1.06 per sq. yd.

Caldwell, O.—The contract for grading and paving the Caldwell-Carlisle road in Olive Twp. with brick has been awarded by the Comrs. of Noble Co. to Abner Juniper, of Nelconville, at \$16,500.

West Newton, Pa.—Contract for paving Vine and 2nd Sts. with concrete has been awarded by the City Council to C. Goehring, of West Newton, at \$15,314.

Richmond, Va.—The contract for paving Broad St. has been awarded by the City Council to the Atlantic Bitulithic Co., at \$50,000.

Milwaukee, Wis.—The following contracts have been awarded for street work by Pub. Wks. Comr. F. G. Simmons: Paving Linnwood Ave., from Oakland to Maryland Aves., Boyce Const. Co., \$1.45 per sq. yd.; paving Prospect Ave., from North Ave. to Lafayette Pl., Boyce Const. Co., \$1.45 per sq. yd.; paving Oakland Ave., from Park Pl. to Edgewood Ave., Boyce Const. Co., \$1.50 per sq. yd.; paving Bartlett Ave., from Folsom Pl. to Kenwood Blvd., Boyce Const. Co., \$1.45 per sq. yd.; paving Martin St., from Broadway to Milwaukee St., and Milwaukee St., from Bidle to Martin Sts., Badger Const. Co., \$1.48 per sq. yd. The material in each case was bituminous asphalt.

BRIDGES

Bids Asked and Prospective Work

Little Rock, Ark.—Plans have been accepted for the Third St. concrete bridge, to cost \$90,000. Bids will soon be advertised for. Address Mayor Charles E. Taylor.

San Bernardino, Cal.—Bids will be received up to 11 a. m. Aug. 6 by the Bd. of Spvs. of San Bernardino Co. for the construction of a truss highway bridge of four 60-ft. spans, with an 18-ft. roadway, across Santa Ana Creek, on the Riverside-Rialto road. Charles Post is Co. Clerk.

Bids will at once be taken by the Bd. of Spvs. for the construction of the proposed bridge across the Santa Ana river on the Riverside-Rialto road. Plans have been accepted and the notice for bids will at once be published.

Canon City, Colo.—According to the plan of the Co. Comrs. of Fremont Co. the bridge across the Arkansas River, below Florence, will be repaired and placed in condition for travel at once. Address Co. Comr. W. H. LaGrange.

Pueblo, Colo.—A petition asking for the construction of a viaduct across the tracks on 8th St. was drawn up and signed by about fifty people at a meeting of the East Side Improvement Assn. Address C. C. White.

Ansonia, Conn.—The bridge over the canal at the continuation of Wooster St. will be pulled down for the purpose of rebuilding the same.

Bridgeport, Conn.—In accordance with instructions from Mayor C. B. Wilson, City Engr. A. H. Terry is making a preliminary survey for the projected bridge across the harbor at the foot of State St.

Dover, Del.—Kent Co. Levy Court will advertise for bids for the building of two concrete bridges, one over Tappanna Marsh and one near Casson's Corner. Mr. Truax, president of the Levy Court, was authorized to build a bridge over Spruance Run.

West Palm Beach, Fla.—Bids will be received Aug. 6 for furnishing all materials and constructing a steel draw-bridge 124 ft. long, 12 ft. wide, with a draw of 50 ft. in the clear, and 178 ft. of timber trestle approach. Address Co. Comr.

Freeport, Ill.—It is stated that the cost of repairing the Stephenson St. bridge according to the recommendations made by Robert McKee will amount to \$5,000.

Pearl City, Ill.—The City Council is planning to expend \$1,500 building and repairing bridges. Address City Clerk.

Richmond, Ind.—At a meeting of the County Council and the Commissioners of Wayne Co., appropriation was made for the erection of a new bridge in Dalton Twp. near the John Retts farm and the new school house.

Sibley, Ill.—The Rd. Comrs. will place three new bridges on the new mile road.

Brookville, Ind.—Bids will be received Aug. 5 for the erection and construction of a concrete steel or wooden bridge across the east fork of White Water River at the foot of 4th St., town of Brookville, according to plans and specifications as prepared by Finan and Hardery, engineers. Address Charles G. Reifel.

Elkhart, Ind.—The Elkhart Ave. bridge over the St. Joseph River is unsafe. Address Co. Surv. Ben Wise.

Huntington, Ind.—The Comrs. of Huntington Co. will receive bids Aug. 7 for the construction of the following bridges: A reinforced concrete bridge over Little River on Broadway, in Huntington; Clark St. bridge over Wabash River at Markle; Funderburg bridge over the Wabash River. Address Harold Guthrie, Co. Aud.

Rensselaer, Ind.—The Comrs. of Jasper Co. will receive bids Aug. 5 for the construction of a steel bridge in Kankakee Twp., a steel bridge in Union Twp. and three concrete bridges in Barkley Twp. Address Joseph P. Hammond, Aud.

Kansas City, Kan.—The Wyandotte Co. Comrs. have instructed Co. Clerk Frank Holcomb to order the Co. Road Supt. to reflow the Turkey Creek bridge.

Bangor, Me.—Plans for the widening of the bridges and abutments on Central St. to conform to the widened street have been completed by the City Engr's. office and bids on the work are to be asked for shortly.

Leominster, Mass.—The Whitney St. bridge has been declared unsafe. Address Edward H. Nutting, Selectman.

Three Rivers, Mich.—The City Council has directed plans and specifications to be prepared for the erection of a bridge across Rock River, just west of Three Rivers. Address City Engr.

Traverse City, Mich.—Plans and specifications for a new bridge across Rock River, just west of the Three Rivers House, were asked for by the City Council. Address Mayor Schaeffer.

Fairmont, Minn.—The Town Bd. will meet Aug. 3 for the purpose of letting a contract for a bridge about 28 ft. span across the creek. Address Martin Eckman, Chmn. of the Town Bd.

Jackson, Miss.—Plans and specifications will be invited at the August meeting of the Hinds and Rankin Co. Bds. of Spvs. for the new steel drawbridge to be built across Pearl River, just north of Jackson.

Monticello, Miss.—Bids will be received by the Bd. of Spvs. of Lawrence Co. Aug. 5 for the construction of a steel bridge across Bahala Creek, on Monticello and Rockport River road. Address J. H. Teunissen, Co. Clerk.

Lincoln, Neb.—Bids will be received Aug. 10 for the construction of eight concrete culvert bridges. Address H. W. Herren, Chmn.

Newark, N. J.—The construction of a new steel bridge at Belleville to replace the old structure, which has served for 35 years, was agreed upon at a recent joint meeting of the bridge committees of Essex, Bergen and Hudson Cos.

Canton, O.—A new bridge over the Nimschillen Creek in Navarre St. is to be built by the Co. Comrs. of Stark Co. this fall. The bridge will be reinforced concrete arch or stone abutments and steel bridge. It is planned to place a bridge over the creek in East North St. Address Comr. Brissel.

New Philadelphia, O.—Bids will be received by the Comrs. of Tuscarawas Co. until Aug. 12 for constructing a steel

bridge over Tuscarawas River. Address Co. Aud.

Wauseon, O.—Bids will be received Aug. 7 for the construction of the following named bridge: Bridge No. 214, sub and superstructure, 130 ft. extreme length and 14 ft. roadway in the clear. Address C. J. Ives, Aud.

Guthrie, Okla.—One hundred and ten thousand dollars in bonds has been voted for the erection of a viaduct here. Address J. E. Nissley, Mayor.

Connellsville, Pa.—The South Penn Engineering Co. is drawing plans for a steel and concrete highway bridge at Carpentertown, in Mt. Pleasant Twp., to replace the old wooden bridge.

Harrisburg, Pa.—A bridge will be constructed in Upper Paxton Twp. Address City Engr. M. B. Cowden.

Hollidaysburg, Pa.—Bids will be received August 6 for the construction of reinforced concrete arch bridges and reinforced concrete girder bridge. Address W. S. Hostler, Clerk.

Pittsburg, Pa.—A new bridge may be erected on the site of the present Ninth St. structure over the Allegheny River, following a recent inspection. Address Allegheny Co. Comr. J. Denny O'Neill.

Pottsville, Pa.—Fifty thousand dollars will be expended repairing bridges in many sections of Schuylkill Co. and in constructing concrete bridges throughout the county. Address Co. Clerk.

Reynoldsville, Pa.—Frank Hillis will receive bids until Aug. 3 for the construction of a concrete bridge over the stream at Ludwick's Mill, in Winslow Twp.

Stroudsburg, Pa.—The Co. Comrs. of Monroe Co. have asked for bids for the erection of abutments and wing walls for an iron bridge over Marshall's Creek, near the John Veisley estate, on the Seven Bridge road, in Middle Smithfield Twp.

Williamsport, Pa.—Bids for the erection of a new steel bridge over the island in the river between Milton and West Milton will be asked for within a short time.

Houston, Tex.—Out of the bridge bonds of \$200,000 the city will construct a new reinforced concrete bridge to take the place of the present iron structure across the ship channel at the foot of San Jacinto St. Besides the San Jacinto bridge improvement, the city will replace the present iron bridge on Preston Ave. over Buffalo Bayou with a reinforced concrete structure. Address City Engr. Dormant.

Bids will be received August 12 for the construction of a creosoted wooden bridge over Taylor's Bayou, on the Webster and Seabrook Road, according to plans and specifications on file in the office of Howe & Wise. Address John B. Ashe, Harris Co. Aud.

Manitowoc, Wis.—Manitowoc and Brown Co. Commissions will build a bridge on the county line. Address Manitowoc Co. Engr. at Manitowoc.

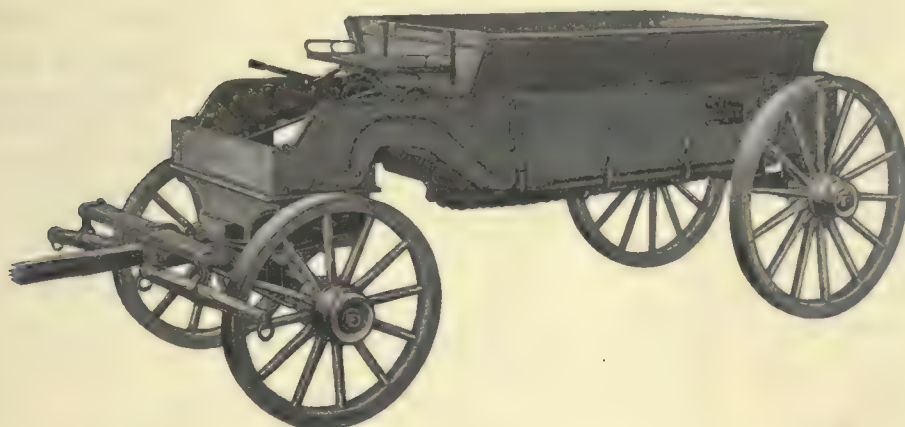
Bids Received and Contracts Awarded

Redding, Cal.—Contract for the construction of the bridge across Oley creek has been awarded to Wm. Stephens, at \$5,100.

Springfield, Mo.—The Canton Bridge Co., of Kansas City, Mo., has secured the contract for the erection and repair of the bridges in Green Co., at \$6,523.

Genoa, Neb.—The following bids have been received for the construction of a steel bridge across the Loup river, (a) five 136-ft. 6-in. steel spans on concrete piers and abutments and (b) five 136-ft. 6-in. steel spans on 60-in. tubular piers and concrete abutments: Des Moines Bridge & Land Co., Des Moines, Ia., (a) \$22,969, (b) \$22,896; Stupp Bros. Bridge & Iron Co., St. Louis, Mo., (a) \$24,864, (b) \$24,040; Ward & Weighton, Audubon, Ia., (a) \$27,139, (b) \$25,875; Elkhorn Const. Co., Fremont, Neb., (a) \$24,303, (b) \$24,907; Massillon Bridge & Structural Co., Kansas City, Mo., (a) \$20,390, (b) \$21,500, awarded contract; Standard Bridge Co., Omaha, Neb., (a) \$24,650, (b) \$24,900; Illinois Steel Bridge Co., Omaha, Neb., (a) \$21,640, (b) \$22,075; Western Bridge & Const. Co., Omaha, Neb., (a) \$23,295, (b) \$24,427; Midland Bridge Co., Kansas City, Mo., (a) \$24,917, (b) \$24,672; Omaha Structural Steel Co., Omaha, Neb., (a) \$21,495, (b) \$21,675; Elkhart Bridge & Const. Co., (a) \$25,900, (b) \$22,780; Beach Mfg. Co., Sioux City, Ia., (a) \$25,999, (b) \$22,940; H. T. Ward & Co., Tecumseh, Neb., (a) \$24,932, (b) \$25,900.

AND STILL THEY COME!



Three times as many orders received for Watsons during the first fifteen days of July as for the same period in 1911. And 1911 was a record breaking year for Watson sales. Why? Watsons cost more than the other makes of wagons. It isn't low price that brings the business. If we had to depend on that we should have to go out of business.

Why is it then that the Watson has more users by many thousands than any other dumping wagon? Here's the answer: The contractor is mightily interested in what he **gets** for what he pays. That's the thing that he looks out for.

He knows that air-dried birch is tougher than kiln-dried stock can ever be. And Watsons are built of air-dried birch. He knows that second growth "A" grade white oak spokes **must** be stronger than common forest growth stock. Here again he chooses the Watson. He knows that a dump wagon on the job is worth ten in the repair shop. Any Watson owner will tell you they are cheapest in upkeep.

Nobody is going to give you something for nothing. We don't expect to. And yet there are the "just-as-goods." Can you guess why you are promised a wagon "as good as the Watson for less money"? Think this over. Then investigate the Watson's record; its draft; its big clearance; its low body; and the stuff that goes into it.

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1102 Farmers Bank Building, Pittsburg, Pa.

604 Witherspoon Building, Philadelphia, Pa.

607 Security Building, Chicago

Buffalo, 1411 Main Street

When Writing Advertisers Please Mention GOOD ROADS.

Newman, Ga.—An election will be held August 2 to vote on the question of issuing \$200,000 road bonds. Address Co. Clerk.

Belleville, Ill.—An election will soon be held to decide the question of issuing \$1,500 in bonds for rebuilding bridges. Address Spvt. John Vogt, of St. Clair Twp.

Mason City, Ill.—Three thousand five hundred dollars in bonds have been voted for paving purposes. Address City Clerk.

Owosso, Mich.—Nine thousand two hundred dollars in bonds has been voted for paving purposes. Address City Clerk.

Monticello, Miss.—Bids will be received August 5 for \$25,000 steel bridge bonds. Address J. H. Teunisson, Clerk.

Beatrice, Neb.—An election will be held August 20 to decide the question of issuing \$11,000 paving bonds. Address City Clerk.

Greensboro, N. C.—Seventy-five thousand dollars in bonds has been voted for street improvements. Address City Clerk.

FOR SALE

10 Ton Buffalo-Pitts Road Roller
22 H. P. Buffalo-Pitts Traction Engine
6-Six Yd. Spreading Cars

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NOTICE TO CONTRACTORS

TRUNK LINE STATE ROAD WORK

Sealed proposals for building a section of state road 4 miles in length on the designated trunk line in the town of Wells will be received by the state commissioner of highways at the State House, Augusta, Maine, until three o'clock P. M., August 14th, 1912.

Alternate bids will be received for the construction of concrete and bituminous macadam.

Specifications and blank forms of proposal will be furnished upon application and a full set of plans may be seen at the office of the state highway commissioner, Augusta, Maine, at the Mousam House, Kennebunk, Maine, and at the Colonial Inn, Ogunquit.

No proposal will be considered unless made on the regular form furnished by the state highway department.

Each bidder must accompany his bid with a certified check payable to P. L. Hardison, state commissioner of highways, for 10% of the amount of his bid.

The successful bidder will be required to furnish a bond as provided by the state road law. The right is reserved to reject any and all bids.

Proposals should be endorsed "Wells Trunk Line No. 2" and addressed to

P. L. HARDISON,

STATE COMMISSIONER OF HIGHWAYS,
AUGUSTA, MAINE.

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When Writing Advertisers Please Mention GOOD ROADS.

GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, AUGUST 10, 1912

Number
6

Convention of the North Carolina Good Roads Association

The annual convention of the North Carolina Good Roads Association was held at Charlotte, N. C., on Thursday and Friday, Aug. 1 and 2. The sessions were held at the Auditorium and were attended by about 300 delegates and visitors.

The first session was called to order at 10 a. m., Thursday, by President H. B. Varner, of Lexington. Addresses of welcome were made by Mayor Bland, of Charlotte; C. O. Keuster, president of the Greater Charlotte Club, and C. C. Moore, who represented Mecklenburg County. After a response by W. C. Feimster, of Catawba County, and the presentation of the reports of the president and secretary, H. B. Varner and Dr. Joseph Hyde Pratt, the chair appointed committees on publicity, membership and nominations. The meeting then listened to a number of formal papers and discussed some of the points brought out. Among the speakers were Dr. Joseph Hyde Pratt, State Geologist of North Carolina; Captain Laughinghouse, Superintendent of the State Prison; G. E. French, of Iredell; Dr. C. P. Ambler, of Asheville; Dr. E. L. Green, E. R. Preston, of Charlotte; G. H. Hilton, Dr. Templeton, of Wake; D. P. Hutchinson, Solicitor Hammer, of Asheboro, and others. Mr. Preston and Captain Laughinghouse both spoke on the subject of convict labor and most of the discussion at the session was on that subject.

At the afternoon session on Thursday, the first speaker was Congressman J. H. Small, who urged the importance of good roads and the necessity for cooperation in obtaining them. Mr. Small was followed by Major W. W. Crosby, Consulting Engineer to the Maryland State Roads Commission, who gave a technical address on road work in Maryland. Other addresses were: "Dirt Roads," by Dr. Joseph Hyde Pratt; "Sand Clay Roads," by W. L. Spoon; "Macadam Roads," by W. S. Fallis, Road Engineer of Iredell County, and "Post Roads," by T. V. Howell, of the Rural Letter Carriers' Association.

The session on Friday morning was devoted to addresses, committee reports, the adoption of resolutions and the election of officers, and other business. The first paper was presented by W. S. Wilson, clerk of the Corporation Commission, who spoke on "State Security for County Bonds." The next paper, "Uniform County Road Location," was presented by M. H. Stacey, professor of civil engineering at the State University. Professor Stacey was followed by R. D. Douglas, president of the Greensboro Chamber of Commerce, on "The County Bond Issue," and by Prof. I. A. Holmes, Chief of the Bureau of Mines of the U. S. Geological Survey, whose paper was entitled "Wide Tires." Other addresses were made by M. T. Willard, of Wilmington, who further discussed wide tires; F. M. Tate, of High Point, who spoke on the relation of the automobile and good roads, and A. G. Batchelder, chairman of the executive committee of the A. A. A.

Dr. C. P. Ambler, of Asheville, chairman of the committee on resolutions, offered a report embodying a number of resolutions, and after some discussion eight of the resolutions were adopted. The principal features of these are as follows: That the North Carolina Good Roads Association is in favor of a state appropriation of \$1,000,000 annually for 20 years and the establishment of a state highway commission; that the association favors the extension by the state of engineering assistance to the counties; that the association favors the use of state convicts for road building; that it condemns the leasing of convicts to private corporations; that it endorses a form of state aid whereby the state becomes security for county road bonds; that it endorses federal aid in road building; that it favors a higher registration tax on motor-driven vehicles, to be regulated according to horsepower and applied to road work; and that it is the opinion of the association that until there is a change in the methods of working convicts, all profits derived from the penitentiary should be used for building public roads either by a state highway commission or by the State Geological and Economic Survey.



GROUP OF DELEGATES AT THE CONVENTION OF THE NORTH CAROLINA GOOD ROADS ASSOCIATION AT CHARLOTTE, N. C.

The afternoon of Friday, Aug. 2, was given over to an outing. Members of the Charlotte Automobile Association furnished cars in which the delegates were taken over the county roads and given opportunities to visit the county convict camps, the new Rozzel ferry bridge and other points of interest.

Officers for the coming year were elected as follows: President, H. B. Varner, of Lexington; Vice Presidents, J. T. Patterson, Roanoke Rapids; R. T. May, Trenton; M. C. Winston, Selma; P. H. Harris, Winston-Salem; P. B. Beard, Salisbury; F. M. Shannonhouse, Charlotte; E. C. Chambers, Asheville; A. B. Skelding, Wilmington, and H. E. Stacey, Roland; Secretary, Dr. Joseph Hyd. Pratt, Chapel Hill; Assistant Secretary, Miss H. N. Berry; Treasurer, Joseph G. Brown, of Raleigh.

Montana Good Roads Congress

The third annual session of the Montana Good Roads Congress was held at Anaconda, Mont., on Monday and Tuesday, July 8 and 9, with a large attendance from all sections of the state.

Among the speakers at the several sessions were Governor Edwin L. Norris, of Montana; Attorney General Galen, of Montana; Chief Justice Brantly and Justice Smith, of the Montana Supreme Court; Prof. Clinton H. Moore, Secretary of the Montana Society of Engineers; Prof. A. W. Richter, of the College of Engineering of the University of Montana; E. P. Mathewson, President of the Anaconda Automobile Club; J. H. Durston, E. W. James, of the U. S. Office of Public Roads, and A. G. Batchelder, chairman of the executive committee of the A. A. A. Besides the regular sessions automobile inspection and pleasure trips were participated in by the delegates.

Resolutions were adopted favoring state supervision of roads, the construction of a park to park road in Montana, the working of federal prisoners in the national parks and on the public roads, federal aid to the states in road building, the construction of a Lincoln memorial road from Gettysburg to Washington, and the repeal of the order compelling the payment of fees for automobiles entering Glacier National Park.

During the second session a constitution and by-laws were adopted, thus making the congress a permanent organization; Kalispell was chosen as the meeting place of the fourth session, in 1913, and officers were elected as follows: President, E. P. Mathewson, of Anaconda; First Vice President, D. P. Curran, of Missoula; Second Vice President, Dr. L. M. Rheem, of Helena; Treasurer, A. T. Davis, of Butte. President Mathewson appointed Martin Martin, of Anaconda, secretary.

Tri-state Road Meeting in Kentucky

At a meeting held recently by the Louisville Automobile Club, the Board of Trade, the Commercial Club, the Retail Merchants' Association and the Advertisers' Club of Louisville, Ky., it was decided to begin preparations for a tri-state road meeting to be held at Mammoth Cave or Bowling Green, Ky., probably late in September of this year.

The special objects of the meeting are the construction of the three roads known as the Central Lincoln Road, the Lincoln-Jackson Way and the Jefferson Davis Highway, and it is expected that there will be laid before the meeting a carefully considered plan of action in regard to their construction. Another point which will be discussed will be the operation of automobiles on roads, with especial reference to the use of alarm signals.

It is planned to hold an old-fashioned barbecue in connection with the meeting, and to bring together automo-

bilists and others interested in good roads in the three states concerned—Kentucky, Tennessee and Indiana. The governors of these three states are to be asked to attend and make addresses, and it is also planned to extend invitations to speak to others prominently identified with the good roads movement.

Road Guide Book of South Carolina

The State Department of Agriculture of South Carolina is engaged in the preparation of a guide book which will form a complete guide for all improved roads in the state.

Besides maps of the roads, the book will contain charts on which will be given detailed information as to distances, the location of hotels and other data. The book will be especially useful to automobilists because of the charts of printed directions supplementing the maps. The arrangement of the chart is shown by the following, which is taken from the notes on the road between Columbia and Augusta, a part of the Capitol to Capitol highway:

Miles.

- 0 Monument, capitol grounds. Go west down Gervais Street, to
- 1.0 Congaree River bridge.
- 1.2 Leave bridge and proceed straight ahead to
- 1.4 Sharp turn to left through principal street of Brookland. Proceed to
- 1.6 Turn sharply to right, keeping straight road ahead.
- 5.4 Cross railroad track.
- 6.2 Disregard road branching to left. Keep to right.
- 6.4 Cross railroad track.

Road Work in Missouri

According to the quarterly report of State Highway Engineer Curtis Hill, of Missouri, road building bonds to the amount of \$854,000 have been issued since May 1, 1911, in special road districts in eleven counties of the state.

The counties and districts, with the amounts voted, are shown in the following table:

County.	District.	Amount.
Lafayette	Lexington	\$125,000
Jefferson	De Soto	30,000
Boone	Columbia	100,000
Callaway	Fulton	105,000
Greene	Springfield	27,000
Barry	Hollister	7,000
New Madrid	New Madrid	93,000
Lawrence	Mount Vernon	50,000
Bade	Greenfield	30,000
Bade	South Greenfield	17,000
Boone	Harg	20,000
Pettis	Sedalia	200,000
Laclede	Lebanon	50,000
Total		\$854,000

In addition to those named, other special road districts have been organized for the purpose of voting bonds. Previous to 1911, it is said, practically no bonds were issued for road construction in the state, except that in 1850 Boone County issued bonds for the improvement of 40 miles of road, and 20 years later Franklin County issued bonds for the construction of 15 miles.

A meeting was held July 19 in Lafayette, La., to consider the good roads question. Mayor Trahan called the meeting to order. Gervais Lombard, Acting State Highway Engineer of Louisiana, addressed the meeting, dwelling upon the history of the good roads movement. He stated that engineers were sent wherever demanded to make surveys and levels for establishing drainage districts. Roads could be built, according to his statement, for from \$600 per mile to \$2,000 per mile in Louisiana, and 90 per cent. of this cost would be expended for drainage. A citizens' committee was formed to cooperate with the Police Jury in studying the road problem.

GOOD ROADS

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AUGUST 10, 1912.

Highway Work in California

N. D. Darlington, of the California Highway Commission, is quoted as authority for the statement that by the first of next year there will be under construction or under contract, work amounting to \$1,000,000.

The work is being done under an \$18,000,000 bond issue, from which no money was available until after the first of this year. Recently surveys have been ordered over the Tejon Pass and Bakersfield road in Division No. 6, a stretch of more than 40 miles on the Bakersfield and Los Angeles road; over the route between King City and San Miguel in Division No. 5 on the Coast Line; over a section of road between San Luis Obispo and Arroyo Grande in Division No. 5, and also between Sisson and Coles in Division No. 2. Contracts have also been let for a 10-mile oil macadam road near Marysville; for the Madero road, which will be 10 miles long and of oil macadam, and for a road extending southerly from San Francisco along the peninsula between San Bruno and Burlingame. This last mentioned road will be 6 miles long, and will consist of an asphaltic wearing surface on a concrete foundation. A grading contract through the mountains has also been awarded between Cloverdale and Hopland, a distance of 14 miles, in Mendocino County.

It is stated that one of the principal aims of the Highway Commission will be to have the roads from San Francisco to San Diego and from San Francisco north to the Oregon line completed before the Panama-Pacific Exposition in 1915.

Special efforts to secure the construction of a comprehensive system of improved roads are being made in San Mateo County, where a campaign has been started for the purpose of securing a bond issue of \$1,204,000 for the construction of a county system. The present plans contemplate the construction of 104 miles of road, which, in addition to the roads through incorporated cities and the proposed state highway extending down the peninsula, will give the county 150 miles of improved road.

The first work in San Mateo County on the state highways will be done on the road already mentioned between San Francisco and Burlingame. The road, of which this forms a part, follows the course of the present El Camino Real from San Francisco to the Santa Clara County line.

This will form the main artery of the system of boulevards that has been ordered.

The 104 miles of road, plans for which have been prepared by County Surveyor J. V. Newman, will cost, according to estimates, \$1,204,000, of which \$45,000 is for bridges and culverts. It is intended to use asphalt on 23.07 miles and to make the rest of the mileage of macadam.

Minnesota Highway Commission Authorizes Construction of Large Road Mileage

At a recent meeting of the State Highway Commission of Minnesota, petitions were approved for the construction of 113.25 miles of road to be built under the Elwell law. The work will involve an expenditure of about \$132,000.

Among the petitions approved were the following: One for a road, 26.25 miles in length, along the line of the proposed Twin City-International Falls state road in Beltrami County, at a cost of \$27,300; one for 30.5 miles of road between Carlton and Brainerd in Carlton County, at a cost of \$40,000; one for a section of road, 5.75 miles long, in Redwood County, at a cost of \$70,444.

A petition for 50.75 miles of road between Farley and Tamarack in Beltrami County, to be built at a cost of \$53,912, was referred to Judge Stanton, of the District Court of Beltrami County, for approval. The road has already been approved by the District Engineer of the Highway Commission and by the Board of County Highway Commissioners. Another petition, that for 55 miles of road in Itasca County along the line of the proposed Duluth-Crookston road, was also held up, in this case for examination, by the District Engineer.

At the meeting, the Secretary of the Highway Commission was directed to arrange for the compilation of all the road laws of the state preparatory to drafting therefrom a new law. It is planned to present this at the next session of the legislature and to ask for its enactment and the repeal of the old laws. The object of this procedure is to codify the present laws in one measure.

Proposed Highway in Madison County, Alabama

The Board of County Commissioners of Madison County, Alabama, has received a proposition from property owners along the Whitesburg Pike for the construction of a road from Huntsville to the Tennessee River, a distance of about 10 miles.

According to the terms of the offer, the property owners will give enough land along the road to make the road 20 ft. wider than at present, will set back their fences to the new line and furnish all of the materials if the county will pay for the construction. It is claimed that this road will soon have to be rebuilt and that the putting in of extra money at this time will be advantageous since the road serves the whole southern and southeastern part of Madison County, and that it will probably eventually become a link in a north and south highway between Huntsville and Birmingham.

The President and Secretary of the Maine State Board of Trade have issued a circular to the members of the organization relative to the good roads campaign now being conducted in the state, reminding them that there is an opportunity for effective work throughout the state, and urging them to work for the passage of a bill by the Maine Legislature authorizing the submission to the voters of a proposed amendment to the Constitution, enabling the state to issue \$2,000,000 in bonds, the proceeds to be devoted to the maintenance of state highways.

Coming Meetings

Aug. 27-29.—League of Third Class Cities of Pennsylvania.—Annual Convention, Wilkesbarre, Penn.

Aug. 27-29.—Union of Canadian Municipalities.—Annual Meeting, Windsor, Canada. Secy.-Treas. W. D. Lightall, 305 Quebec Bank Bldg., Quebec, P. Q.

Sept. 2-7.—International Association for Testing Materials.—Sixth Congress, Engineering Societies Bldg., 29 W. 39th St., New York, N. Y. Secy., H. F. J. Porter, 29 W. 39th St., New York, N. Y.

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J. Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements. Annual Convention, Dallas, Tex. Secy., A. Prescott Folwell, 50 Union Sq., New York, N. Y.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

Permits for over 5 miles of concrete sidewalk have been granted this year in the city of Oshkosh, Wis.

Estimates for 1913 road and bridge expenditures in Hennepin County, Minnesota, amount to \$200,000, an increase of \$20,000 over those for the present year.

Surveys for the state highway which will eventually extend from the limits of Minneapolis, Minn., to International Falls were recently started by the Minnesota State Highway Commission.

It is reported that the promoters of the Sheridan Road near Chicago, Ill., after a recent visit to the concrete roads in Wayne County, Mich., have decided to construct the Sheridan Road according to the Wayne County specifications. The Sheridan road will be 150 miles in length.

At a recent conference of the city officials of St. Paul, Minn., it was decided that the city proceed to pave 4th and 5th Sts. by day labor or force account. This work, according to reports, is being undertaken as an experiment to determine whether or not it will be cheaper for the city to do the work than to have it done by contract.

A committee of 25 citizens was recently appointed by the Police Jury and the City Council of Lafayette, La., to formulate plans for the construction of a system of roads in Lafayette Parish. The committee has organized by electing the following officers: Chairman, C. O. Mouton; secretary, R. C. Greig, and treasurer, J. A. Roy.

In Cedar Township, Kansas, the road overseer has recently had thirteen road drags constructed for the use of the farmers of the township. During the past year, it is said, a larger road mileage has been graded and put in good condition than ever before, and it is expected that the drags will be used to maintain and still further improve the condition of the roads.

The city of Melrose, Mass., has adopted the plan of laying gas, sewer and water mains and running connections therefrom to the street lines on all new streets where there are undeveloped building lots, instead of deferring the making of house connections until after houses are built or under construction and the streets improved, and thereby making it necessary to tear up the pavement.

The City Council of Cedar Rapids, Ia., has recently voted to change the specifications for paving brick in use in the city by changing the allowable loss by abrasion from 22 to 18 per cent. Four years ago, when the commission form of government was adopted, the percentage was changed from 18 to 22, and it is stated that since the change was made considerable trouble has been experienced with inferior brick.

The County Commissioners' Court of Grayson Co., Texas, recently awarded a contract for the construction of about 78 miles of road. The award was made to the Larkin Construction Co., of Dallas, for \$255,019.40. The funds for the work are to be supplied by the sale of bonds to the amount of \$400,000 recently voted. It is expected that the work will be commenced in Sherman, the county seat, in which about 12 miles of the proposed road system will be built. This will be in addition to the streets to be paved with the \$100,000 voted for that purpose on July 25.

Personal Notes

C. H. Ohme has resigned as City Engineer of Tuscaloosa, Ala.

C. L. Proctor has been appointed city engineer of Hornell, N. Y., by the Board of Public Works.

John J. King, an inspector in the Department of Highways of Brooklyn,

N. Y., died recently at the home of his parents in Brooklyn.

Frank D. Aber, who has been Superintendent of Cross Walks and Repairs in Newark, N. J., since 1896, died recently at the age of 72.

Frank W. Solon has been appointed Superintendent of Streets and Wm. J. Galligan, 2d, Assistant Superintendent of Streets of Chicago, Ill., by Commissioner of Public Works L. E. McGann.

B. H. Klyce, Assoc. M. Am. Soc. C. E., formerly City Engineer of Jackson, Miss., has been appointed City Engineer of Waycross, Ga., to fill the vacancy occasioned by the resignation of H. H. Pofford.

Geo. D. Marshall, Superintendent of Road Construction of the United States Office of Public Roads, has been ordered to San Angelo, Tom Green County, Texas, to assist the Board of County Commissioners in the construction of roads and bridges to be built in the county.

Samuel Hill recently entertained the British Columbia and Seattle delegates to the Pacific Highway Association convention at San Francisco at his country estate at Maryhill, Wash. During the visit of the delegates they inspected the roads which Mr. Hill has had constructed.

Trade Notes

The Special Council Committee on Bridges of Minneapolis, Minn., has selected the Concrete Steel Engineering Co., of New York City, as consulting and resident engineer on the proposed Mississippi River bridge at 3d Ave., South.

L. I. Foster, formerly of Bradford, Pa., a member of the Binghamton Paving Block Co., a firm recently organized for the manufacture of paving brick, has assumed charge of the erection of the plant of the company on the line of the Delaware & Hudson Railroad, near the village of Port Dickinson, N. Y.

A patent has recently been granted to the Fibred-Asphalt Co., Inc., of St. Albans, W. Va., for a pavement consisting of wood fiber impregnated with pitch and asphalt. The fiber used is a by-product of the manufacture of tannin and other products and consists of the residue of hard woods remaining after the softer portions have been extracted. A test road of the material was constructed at St. Albans a year ago, and is said to have come through the winter satisfactorily, although laid crudely and without proper machinery. Another section was laid in Wilmington, Del., this spring and it is said that another section is to be put down near Memphis, Tenn.

CONTRACT NEWS

CONTRACTS PENDING ROADS AND STREETS

Date of letting.	Reported in
8-10 Houston, Tex., paving.....	8-3
8-10 Racine, Wis., grading, street wk.7-27	8-3
8-12 Chillicothe, Mo., paving, curbing.8-3	8-3
8-12 Marion, Ala., road work.....	7-27
8-12 Rockford, Ala., road work.....	7-27
8-12 Hastings, Neb., paving.....	8-10
8-12 Ashtabula, O., grading, paving.8-10	8-10
8-12 Lisbon, O., road work.....	7-27
8-12 Houston, Tex., grading & paving.8-10	8-10
8-13 Livingston, Ala., road work.....	7-27
8-13 Boston, Mass., oil surfacing.....	8-10
8-13 Cedar Rapids, Ia., paving & curbs.8-3	8-10
8-13 Omaha, Neb., paving.....	8-10
8-13 Temple, Tex., brick or w. blocks.8-3	8-10
8-14 Athens, O., paving.....	8-10
8-14 Cleveland, O., road work.....	7-27
8-15 Elyria, O., macadamizing.....	8-10
8-16 Cincinnati, O., road work.....	8-10
8-19 Sedalia, Mo., brk. & concrete pav.8-10	8-10
8-19 Camden, N. J., paving.....	8-10
8-19 Columbus, O., road work.....	8-10
8-19 Lisbon, O., road work.....	8-10
8-19 Toledo, O., road work.....	8-16
8-22 Jasper, Ala., road work.....	8-10
8-22 Columbus, O., road work.....	8-10
8-23 Birmingham, Ala., road work.....	8-10
8-23 Talladega, Ala., road work.....	8-10
8-12 Shreveport, La., road work.....	8-10

BRIDGES.

8-10 Lincoln, Neb., conc. culverts....	8-3
8-12 Searle, Ala., conc. bridge.....	7-27
8-12 Lawrenceburg, Ind., bridges.....	7-27
8-12 New Philadelphia, O., steel bridge.....	8-3
8-12 Houston, Tex., creosoted wooden bridge.....	8-3
8-13 Reading, Pa., replanking.....	8-10
8-16 Cincinnati, O., concrete bridge.7-27	8-10
8-16 Franklin, Pa., plate girder.....	8-10
8-19 Lewisburg, Pa., plate girder br.8-10	8-10
8-23 Lock Haven, Pa., br. approach.8-10	8-10
8-24 Cleveland, O., steel arch bridge.8-10	8-10
8-24 Muskogee, Okla., 12 bridges.....	8-10
8-4 Tallulah, La., 3 bridges.....	7-27

MISCELLANEOUS.

8-12 Elyria, O., furnishing slag....	8-10
8-13 Boston, Mass., oiling.....	8-10
8-13 Columbus, O., furnishing blocks.8-10	8-10
8-13 St. Louis, Mo., sidewalk constr.8-10	8-10
8-15 Sandusky, O., bonds.....	8-10
8-19 Nottingham, O., bonds.....	8-10
8-29 Dayton, O., bonds.....	8-10

ROADS AND STREETS

Bids Asked and Prospective Work.

Birmingham, Ala.—Bids will be received on Aug. 28 for the construction of the model highway to be constructed in Jefferson Twp. on the Talladega and Mardis roads. The appropriation for the work is \$8,000.

Jasper, Ala.—Bids will be received by the Court of County Commissioners of Walker County at Jasper, Ala., until Aug. 22, for grading and draining part of the Jonesboro road, beginning at Frogague Creek. W. S. Keller, State Highway Eng.

Talladega, Ala.—Bids will be received by the Court of County Commissioners of Talladega Co., until Aug. 28, for grading, draining and surfacing with gravel, part of the Talladega and Mardisville road. W. S. Keller, State Highway Eng.

Little Rock, Ark.—Property owners on W. 7th St. have petitioned for its paving. Chas. E. Taylor is Mayor.

Santa Monica, Cal.—Ordinances of intention for paving work which will require an expenditure of \$100,000 have been passed, and specifications for the work approved. This includes over 6 miles of oil gravel paving.

Champaign, Ill.—Plans have been made for street paving to cost about \$80,000.

East St. Louis, Ill.—The Board of Local Improvements of East St. Louis adopted plans for the improvements of State St. Address City Eng. Edwin F. Harper.

Indianapolis, Ind.—City Engr. Henry W. Klausmann has prepared plans and specifications for paving Wyoming St., between Delaware and High Sts., and 31st St., between Delaware St. and Central Ave., at an estimated cost of \$19,870 and \$16,200, both estimates being based on wood block pavement.

Terre Haute, Ind.—Property owners on Wabash Ave., between 19th and 30th Sts., have petition that the street be paved with bituminous macadam.

Des Moines, Ia.—The City Council has passed resolutions of necessity for paving on the following: 32nd, Forest to College; 14th, Crocker to Ascension; 39th, School to Kingman; 22nd, Clark to Washington, and Ascension, between 6th Ave. and 4th St.

Henderson, Ky.—The Fiscal Court of Henderson Co. has appropriated \$10,000 for repairing county roads.

Shreveport, La.—The Parish Engr. J. T. Bullen, has been authorized to advertise for bids to be received Sept. 12 for the construction of a hard surfaced road leading south from Shreveport along Red River for a distance of about 5 miles.

Boston, Mass.—Sealed bids will be received by the Mass. State Highway Comm. at its office, 15 Ashburton Pl., Boston, until noon, Aug. 13, for the placing of oil surfacing on 13,500 ft. of road in Plymouth. F. R. Bieler is Secy. of the Comm.

Charlton, Mass.—Efforts are being made to secure the macadamizing of Main St. through the village at an estimated cost of about \$3,000.

Warren, Mass.—At a recent special town meeting it was voted to appropriate \$300 for repairing macadam road in Warren and West Warren.

Williamstown, Mass.—At a recent special town meeting the sum of \$3,000 was appropriated for road work, expenditure to be made on the Green River road to the New Ashford line. It was also voted to accept the offer of Robt. Cluett to give \$5,000 for the rebuilding of the Gale road. This latter work will be commenced this year.

Saginaw, Mich.—The repaving of Genesee Ave., from the river to Jefferson Ave., in 1913, is being considered by the city officials.

Minneapolis, Minn.—Extensive road improvement work is planned for next year by the Bd. of Co. Comrs. of Hennepin Co. The Bd. will ask the Tax Levy Bd. to appropriate \$200,000 for roads and bridges.

St. Paul, Minn.—The Bd. of Pub. Wks. has passed an order for the paving of Broadway, between 4th and 7th Sts., before the end of the season. The estimated cost will be about \$20,000. It is expected that over \$500,000 will be expended in the near future for street paving in the city.

St. Joseph, Mo.—Petitions have been presented to the Bd. of Pub. Wks. for paving Penn St., between 16th and 26th Sts., with Hassam and Michigan and Massachusetts Sts., between King Hill and Tobe Aves., with mineral rubber asphalt.

Sedalia, Mo.—Sealed bids will be received by the City Clerk until 5 p. m. Aug. 19 for paving Park Ave., between 3d St. and Broadway, with brick on a concrete foundation, 4,800 sq. yds. Bids will also be received for 1,000 sq. yds. of concrete alley pavement. F. T. Leaming is City Engr.

St. Louis, Mo.—The Bd. of Local Impts. has adopted plans and specifications for the improvement of State St., and has authorized the work.

Springfield, Mo.—The Council is planning to pave Robberson Ave. with asphaltic concrete paving. Address J. H. Langston, City Clk.

Hastings, Neb.—No bids having been received for the repaving of 2d St. between St. Joe and Burlington Aves., the City Council has extended the time for the receipt of bids to Aug. 12.

Omaha, Neb.—Sealed bids will be received by the City Clk. at 10 a. m. Aug. 13 for the paving with asphalt, stone, vitrified brick, artificial stone, macadam or creosoted wood block the following: First alley south of Dodge St., between 34th and 35th Sts., in Block 12, west end addition; alley between 34th and 35th Sts., running north and south in Block 12, west end addition; 33d St., between Woolworth and Lincoln Aves.; Cumming St., between 43d St. S. and 48th St.; first alley north of Farnam St., running east and west in Block 12, west end addition; Burt St., between 24th St. and Central Blvd.; 19th St., between Harney and Farnam Sts.; 25th St., between Maple and Blaney Sts.; 19th Ave., between St. Marys Ave. and Jones St.; Chicago St., between 12th St. and 13th St. Bids must be addressed to Thos. J. Flinn, City Clk., Council Chamber, City Hall.

Camden, N. J.—Sealed bids will be received by Joshua C. Haines, Chairman of the Committee on Streets and Highways, until Aug. 19, for furnishing labor and materials for paving a number of streets and alleys throughout the city.

Ashtabula, O.—Sealed bids will be received by M. H. Turner, Director of Pub. Service, until noon, Aug. 12, for the grading, draining, curbing and paving with shale blocks upon a concrete foundation Fitch St., between Fisk and Center Sts. The work includes 246 cu. yds. of excavation, 795 lin. ft. of curbing, 1,364 sq. yds. of pavement, 4 catchbasins, 86 lin. ft. of 12-in. storm sewer, 1 manhole and 1-000 sq. ft. of cement walk.

Athens, O.—Bids will be received by Service Director Williams on Aug. 14 for the paving of Park St., between E. State St. and Franklin Ave., and Franklin Ave., from Park St. to the present terminus of the brick paving at the north end of that street.

Cincinnati, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Hamilton Co., at the Court House, Cincinnati, at noon, Aug. 16, for the following: Widening Main St. (Reading Rd.) and the extension of two culverts at the south end of Reading in Sycamore Twp. under Specification No. 375; improving 5-500 ft. of the Riddle Rd., west from Springfield Pike in Springfield Twp., under Specification No. 376.

Sealed bids will be received by the Bd. of Co. Comrs. of Hamilton Co. until noon, Aug. 23, for the improvement, under Specification No. 381, of the Yonote Rd., from Beaumont St. to the end of the improvement north of the Madisonville Rd. in Columbia Twp.

The City Council has passed ordinances determining to proceed with the improvement of the following: Highland Ave., between Melish Ave. and Goodman St.; Doberrer Ave., between Froome and Hand Aves.; Eastern Ave., between Philadelphia and Ferry Sts.; Durrell Ave., between Lincoln Ave. and Chapel St.; State Ave., between 6th and Harrison Aves.

The City Council has passed resolutions of necessity for the improvement of the following: Winton Rd., between Spring Grove and Hand Aves.; Eastern Ave., from the first angle east of Delta Ave. to the old corporation line of Linwood; Knox St., between Thompson Ave. and Saturn; Sauer Ave., from Warner St. to a point 200 ft. south of Parker St.; Court St., between Sycamore St. and Broadway.

Columbus, O.—Sealed bids will be received by State Highway Comr. James R. Marker, at the office of the State Highway Commission, Columbus, until noon, Aug. 19, for the following: For furnishing the labor for grading and paving with water bound macadam the Lancaster and Newark Rd., State Highway A, Petition No. 449, in Walnut Twp., Fairfield Co.; length, 22,616.5 ft.; width of pavement, 12 ft.; estimated cost of furnishing labor, \$3,630. For furnishing labor for grading and paving with concrete the Ghent Rd., State Highway E, Petition No. 409, in Copley and Bath Twp., Summit Co.; length, 12,546.2 ft.; width of pavement, 14 ft.; estimated cost of furnishing labor, \$8,350. Plans and specifications are on file at the offices of the Co. Comrs. and at the State Highway Dept.

Sealed bids will be received by State Highway Comr. James R. Marker until Aug. 22 for the following: Grading and paving with water bound macadam the Allensville extension road, State Highway C, Petition No. 418, Richland Twp., Clinton Co.; length, 11,614.7 ft.; width of pavement, 12 ft.; estimated cost of construction, \$12,317.88. Grading and paving with water bound macadam Monroeville and Bloomington Rd., State Highway B, Petition No. 628, Oxford Twp., Erie Co.; length, 5,500 ft.; width of pavement, 10 ft.; estimated cost of construction, \$4,743.67. Grading and paving with water bound macadam having a bituminous surface treatment, Section No. 2 of the Port Clinton Rd., State Highway A, Petition No. 255, Rice Twp., Sandusky Co.; length, 11,500 ft.; width of pavement, 16 ft.; estimated cost of construction, \$19,438.68. Alternative bids will also be considered for grading and paving the above road with a bituminated concrete; estimated cost of construction, \$23,255.12; grading and paving with bituminous bound macadam on Monroe Turnpike Road, State Highway D, Petition No. 363, Adams Turnp., Lucas Co.; length,

18,897.5 ft. width of pavement, 16 ft.; estimated cost of construction, \$27,684.18. Alterations bids will also be considered for grading and paving the above road with a bituminated concrete, estimated cost of construction, \$33,609.91. Plans and specifications for the foregoing are on file at the office of the Rds. of Co. Comrs. and at the office of the State Highway Dept.

Sealed bids will be received by State Highway Comr. James R. Marker at the office of the State Highway Dept., Columbus, until 1 p. m., Aug. 22, as follows: For grading and paving with water bound macadam and concrete the Rimer road, State Highway A, Petition No. 638, in Sugar Creek Twp., Putnam Co.; length, 7,130 ft.; width of pavement, 14 ft.; estimated cost, \$5,153.35. For grading and paving with bituminated concrete the Circleville-Washington road, State Highway A, Petition No. 589, Wayne Twp., Pickaway Co.; length, 5,134 ft.; width of pavement, 20 ft.; estimated cost, \$12,694.40. For grading and paving with bituminated concrete the Circleville-London road, State Highway B, Petition No. 544, Darby Twp., Pickaway Co.; length, 5,280 ft.; width of pavement, 14 ft.; estimated cost of construction, \$3,316.25. For grading and paving with bituminated concrete the Weeds Corner extension road, State Highway E, Petition No. 372, Leroy Twp., Lake Co.; length, 11,686 ft.; width of pavement, 12 ft.; estimated cost, \$21,626.66. For grading and paving with brick for light traffic the Petersburg road, State Highway B, Petition No. 413, Center and Union Twp., Carroll Co.; length, 5,500 ft.; width of pavement, 14 ft.; estimated cost, \$17,215.50. For grading and paving with brick for light traffic the Steubenville-Canton road, State Highway C, Petition No. 414, Center Twp., Carroll Co.; length, 7,025 ft.; width of pavement, 14 ft.; estimated cost, \$22,356.70. For grading and paving with brick for heavy traffic the Salem and Elsworth road, State Highway G, Petition No. 379, Perry Twp., Columbiana Co.; length, 5,280 ft.; width of pavement, 10 and 14 ft.; estimated cost, \$14,622.64. Plans and specifications for the foregoing work are on file at the office of the several boards of county commissioners and at the State Highway Dept. at Columbus.

The City Council has passed ordinances providing for proceeding with the following street improvements: Martin Ave., between Town St. and Sullivan Ave., asphalt or brick paving; Mt. Vernon Ave., between Neilston St. and Cleveland Ave., repaving with brick or stone block; alley north of Mt. Vernon Ave., between Graham and Johnson Sts., brick paving; Oregon Ave., between 2d and 3d Aves., brick paving; Clive St., from Parsons Ave. to east terminus, asphalt or brick paving; Sherman Ave., from Franklin Ave. to the alley north of Bryden Rd., asphalt or brick paving; Indiana Ave., between Framdes and Lane Aves., asphalt paving; Deshler Ave., from Parsons Ave. to East Terminus, asphalt or brick paving; Conklin St., from the alley west of Neil Ave. to Michigan Ave., brick paving; 20th St., between Oak St. and Bryden, asphalt or brick paving; State St., from the alley west of Yale Ave. to Central Ave., asphalt or brick paving; High St., between the north and south lines of James Chestnut's subdivision, brick paving; Cole St., between Wilson and Kimble Pl. Aves., asphalt or brick paving; Hayes Ave., between Mt. Vernon Ave. and Atchison St., asphalt or brick paving.

The City Council has passed an ordinance of necessity for the improvement of Summit St., between Hudson St. and Indiana Blvd., by grading, draining, curbing and paving the roadway with asphalt or brick.

Elmira, O.—Bids will be received until Aug. 15 for grading and macadamizing streets. T. D. Ellenberger is City Clk.

Lisbon, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Columbiana Co. on Aug. 19 for the improvement of a section of the East Liverpool and Fredericktown Rd., extending from the end of the present pavement in Calcutta toward Fredericktown.

Bids will be received until Aug. 19 for grading and paving with brick one mile of road in St. Clair township. P. R. Walker is Chief Clk.

Newark, O.—Ordinances have been passed determining to proceed with the improvement of Cedar St., from the cemetery office to the corporation line; Granville St., between 11th and 16th Sts., and Union St., between Pine St. and the south corporation line.

Toledo, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Lucas Co. at the office of the Co. Audr. at the Court

House in Toledo, until 10 a. m., Aug. 19, for grading, draining and macadamizing a county road known as Waterville Twp. stone and gravel road No. 27. Chas. J. Souzenbacher is Audr.

Zanesville, O.—The Chamber of Commerce has presented to the City Council a petition for the repaving of Main St.

Portland, Ore.—City Engr. Hurlburt has filed with the City Audr. paving estimates amounting to \$241,810.

Milwaukee, Ore.—The Council has passed an ordinance for paving on Foster Rd. for a distance of 12 blocks, at an estimated cost of \$18,000. It is expected that the work will be done this fall.

Meyersdale, Pa.—Rockwood Boro. has voted to extend the indebtedness of the borough by \$10,000 to provide funds for paving and sewer work.

Pittsburgh, Pa.—The City Council has passed an ordinance authorizing the Mayor and Director of the Dept. of Pub. Wks. to advertise for bids and award a contract or contracts for repaving work as follows: Allen St., from Warrington Ave. to Climax St., \$5,500; Middle St., from North Ave. to Knoll St., \$3,800; Reed St., from Pride St. to Vine St., \$2,200; Rose St., from Overhill St. to Dinwiddie St., \$4,200; Tustin St., from Van Braam St. to Marion St., \$2,500; Harrison St., from 48th St. to 50th St., \$8,500; Adelaide St., from angle north of Camp St. to Milwaukee St., \$3,200; Millvale Ave., from Center Ave. to bridge, \$8,400; Devilliers St., from Center Ave. to Rosa St., \$3,000; Watson St., from Van Braam St. to Gist St., \$4,500; Fallowfield Ave., from Broadway St. to Sebring St., \$8,500.

The City Council has passed ordinances authorizing the grading, paving and curbing of the following: Gold alley, between Denver St. and Athlinton Ave., and Kirkpatrick St., between Bedford Ave. and Grant Blvd.; Samantha alley, between Stanton Ave. and Baywood St.; Watson St., between Stevenson and Pride Sts.; Stanford Rd., between Brighton and Campus St.; Academy Lane, between Diploma and Campus Sts.; Diploma St., between Stanford Rd. and Campus St.; Campus St., between Davis Ave. and Diploma St.; Lloyd St., between Reynolds and Robinson Sts.; Atherton Ave., between Liberty Ave. and the bridge over the Pennsylvania R. R.; Merritt St., from Taggart St. to a point 34 ft. northerly.

Houston, Tex.—Sealed bids will be received at the office of D. C. Smith, Jr., Controller and City Secy., at City Hall, until noon, Aug. 12, for grading and paving as follows: Houston Ave., between Washington Ave. and Spring St., vitrified brick on 5-in. concrete foundation; German St., from Berings Mill to Buffalo St., vitrified brick on 3-in. gravel foundation; Dallas Ave. and San Felipe St., from Milan St. to Wilson Ave., vitrified brick on 8-in. concrete foundation; Webster Ave., between Main and Crawford Sts., vitrified brick on 5-in. concrete foundation. The vitrified brick for all of this work will be furnished by the city and delivered on the ground.

Spokane, Wash.—Plans for two paving projects in the Manito district have been transmitted to the Dept. of Pub. Wks. by City Engr. McCarthy. The first is the paving of 9th and 10th Aves., and Rockwell Blvd., from Grand Blvd. to a point 105 ft. west of Hatch St. The cost of the work is estimated at \$98,700. The other is the paving of 17th Ave. and Upper Terrace Rd., from Division St. to Rockwell Blvd.

Toppenish, Wash.—City Engr. Cotingham has prepared plans and specifications for the paving of the entire business district.

Bids Received and Contracts Awarded

Little Rock, Ark.—The Bd. of Pub. Affairs has awarded a contract for grading the streets for the right of way of the new south end loop of the Little Rock Street Railway to M. D. L. Cook, of Little Rock.

San Diego, Cal.—The low bid for the grading of 22d St. was submitted by John Engbretonson, at \$4,218.70. The low bid for paving India St. was submitted by Ford & Stout, of Los Angeles, as follows: Grading, \$100; gutters, 35 cts. per ft.; curbing 35 cts. per ft.; paving, 17.2 cts. per sq. yd.; culverts and catchbasins, \$2,700. The Fairchild-Gilmore-Wilton Co. bid 18.5 cts. for paving; 36 cts. for curbing 37 cts. for gutters; \$2 and \$2.25 per lin. ft. for culverts. The Barber Asphalt Co. bid 11.8 cts. for paving; 36 cts. for gutters; 37.5 cts. for curbs, and \$100 for grading.

Jacksonville, Fla.—The Bd. of Co. Coms. of Duval Co. has received bids for im-

provement of the road from Duval Station to the Nassau River, 4 1/2 miles long, as follows: Grubbing, per acre, H. Lowe, \$38; J. J. Whitaker, \$39; Sam Spencer, \$35; G. I. Tison, \$34; Rollins & Harney, \$32; A. E. Henderson, \$33.50. Grading, per cu. yd., H. Lowe, 18 cts.; J. J. Whitaker, 28 cts.; Sam Spencer, 20 cts.; G. I. Tison, 19 1/2 cts.; Rollins & Harney, 24 cts.; A. E. Henderson, 18 1/2 cts.

Belvidere, Ill.—A contract for macadamizing West Locust and Buchanan Sts. has been awarded to Fair & Taylor.

Canton, Ill.—A contract for the paving of N. 1st Ave., between Chestnut and Birch Sts., has been awarded to Roller & Savill.

Galesburg, Ill.—The Bd. of Local Impts. has awarded a contract for paving North St., from Kellogg St. to the C. B. & Q. R. E. tracks, to J. B. McAuley, for \$20,384.75. The Burlington Constr. Co. bid \$20,950, and the E. R. Harding Co., of Racine, Wis., bid \$20,449.

Peoria, Ill.—The City Council has awarded the contract for paving with brick 6 blocks on Columbia Terrace, formerly known as Columbia Ave., to Canterbury Bros. for \$19,554.80. Other bids were received as follows: McElwee & Bushell, \$23,528; E. A. Meyers, \$22,134.80; A. B. Thompson, \$21,941.20. The Council also awarded a contract for the paving of Stanley St., from Adams St. to Krause Ave., with brick, to Douglas A. Myers, for \$5,664.20. McElwee & Bushell bid \$6,191.70.

Paving contracts have been awarded as follows: Spring St., brick, to John McAllister; Bigelow St., asphalt, to J. H. Bushel & Co.

Rock Island, Ill.—The Bd. of Local Impts. has awarded a contract for the paving of 27th St., between 5th and 9th Aves., to the Independent Constr. Co., of Davenport, Ia., for \$13,962. The unit prices were \$1.95 per sq. yd. for brick paving on concrete foundation and 65 cts. per lin. ft. for curb and gutter. The Tri-City Constr. Co. put in a total bid of \$13,976.

Waukegan, Ill.—The Bd. of Local Impts. has awarded to Chas. Payne, of Waukegan, a contract for the construction of retaining walls on Belvidere St. for \$937.30; to the Boyce Constr. Co., of Chicago, a contract for paving Steele Court and Cory Ave. for \$12,764; a contract for paving Madison St., Fairview Pl., Clayton St. and Sherman Pl., for \$8,405, and a contract for paving Lawn Court for \$1,071.90.

Des Moines, Ia.—The City Council has received paving bids as follows: 32d St., University to Carpenter, asphalt paving, Bryant Asphalt Co., \$1.89 per sq. yd.; Des Moines Asphalt Co., \$1.92. 37th St., Kingman to Cottage Grove Ave., asphalt paving, Bryant Asphalt Co., \$1.89; Des Moines Asphalt Co., \$1.92. 21st St., Forest to Clark, Bryant Asphalt Co., \$1.89; Des Moines Asphalt Co., \$1.92. Beckwith, 6th to 7th, concrete paving, J. L. Hansman, \$1.25; Walner Co., \$1.22. 37th, Ingersoll to Woodland Ave., bitulthic paving, Des Moines Asphalt Co., \$2.10; James Horrabin, \$1.97.

Dubuque, Ia.—The City Council has awarded a contract for paving a portion of Kaufmann Ave., 6,704 sq. yds., with Burlington brick block, to Kenety & Lee. The Council also awarded the contract for the improvement of Grand View Ave. to Tibby Bros. for about \$12,000.

Fairfield, Ia.—The City Council has awarded a contract for the construction of 1,720 sq. yds. of creosoted wood block pavement on N. Main St. to Spalding & Kerns, of Fairfield, at \$2.42 per sq. yd. The Council also awarded a contract for the construction of 3/4 mile of brick pavement with asphalt filler on N. 4th St., between Stone St. and the city limits, to J. C. Blunk, of Ottumwa, at \$1.95 per sq. yd.

Perry, Ia.—The City Council has awarded a contract for paving Otley Ave. to W. G. Birdsall, of Perry.

Winchester, Ky.—The City Council has awarded a contract for paving a portion of Main St. with brick to Daniels, Lyst & Douglas, of Anderson, Ind., for \$35,555.

Baltimore, Md.—The Maryland State Roads Comn. has awarded contracts as follows: Carroll Co., the road between Woodbine and Day, to French and Allen, for \$14,941.88; road from Middleburg Station to Mt. Union, to Thomas, Poole & Hunter, for \$13,545.

Boston, Mass.—Bids for repaving with wood block on streets torn up during the construction of the subway have been received by the Supt. of Sts. as follows: James Doherty, Boston, \$2.69 per sq. yd.; Wm. J. Barry, Boston, \$2.78 per sq. yd.; Central Constr. Co., Boston, \$2.81 per sq. yd. It is estimated that the total cost of the work will be \$100,000.

Westfield, Mass.—A contract for the construction of a granite block pavement with cement granite on N. Elm St. and Sidney Ave. has been awarded to Daniel O'Connor Sons, of Holyoke, Mass., for \$12,300.09, and other bids were received as follows: Archambault & Fiege, Waterbury, Conn., \$16,228.72; E. B. Roberts, Boston, \$15,536.15; John L. Barry, Westfield, \$15,896.50.

Bay City, Mich.—The Bd. of Pub. Wks. has rejected all bids for paving on Marquette Ave. and Farragut St. because the bids exceeded the Engr's estimate.

New York, N. Y.—Bids for highway work in the Boro. of Queens, amounting to \$591,786, have recently been received. The work and the lowest bids received in each case were as follows: Vernon Ave., Long Island City, from Fulton Ave. to 4th St.; length, 3 miles; regulating and repaving with improved granite blocks and with redressed granite blocks on a concrete foundation; Astoria Constr. Co., \$211,645. Broadway, in the town of Flushing, from 10th St., Bay Side, to Main St., Douglass, about 1 mile, regulating, grading, curbing and paving with granite blocks on a concrete foundation; Newman & Carey, \$47,571. Jackson Ave., Long Island City, from Thompson Ave. to Borden Ave., repaving; Republic Constr. Co., \$104,225; Corona Ave., from Broadway through Corona to Strong's Causeway, about 2 miles, granite block and wood block paving; J. F. Hill, \$91,398. 3d and 4th Sts., Woodside, between Woodside and Riker Aves., laying sidewalks and curbs; Garcey Constr. Co., \$9,928. For regulating and grading Franklin St., Astoria, from Boulevard to Halsey St.; curbing and laying crosswalks from Boulevard to Halsey St., and on the north side, from Halsey St. to Monson St., Peace Bros., \$2,921. Same to Sherman St., Long Island City, from Washington Ave. to Payntar Ave., Cooper & Evans Co., \$25,184. Same in Clinton Ave., from Clermont Ave. to Willow Ave., Maspeh, Peace Bros., \$6,095. Same in Fairview Ave., from Woodbine to Gates, Ridgewood, Charles A. Meyers, \$1,254. Same in Boulevard, Long Island City, from Payntar Ave. to Webster, Cooper & Evans Co., \$26,422. Same north side of Bayview Ave., from Forest Ave. to the Strand, Rockaway, Garcey Constr. Co., \$1,728. Same in Marion St., Long Island City, from Payntar Ave. to Washington Ave., Cooper & Evans Co., \$31,818. Same in Elm Ave., from Fresh Pond Rd. to Myrtle Ave., Evergreen, Chas. A. Meyers, \$1,879. Catalpa Ave., Ridgewood, from Fresh Pond Rd. to Myrtle Ave., sheet asphalt paving on a concrete foundation, Uvalde Asphalt Co., \$19,720.

Oneonta, N. Y.—A contract for paving 6 streets with Corning brick block on a 5-in. concrete foundation has been awarded to the J. H. Nelson Contracting Co., of Herkimer, at \$2.35 per sq. yd. The total cost will be about \$40,000.

Rochester, N. Y.—The Bd. of Contract and Supply has awarded contracts as follows: Kelly St., brick pavement, to the Schroeder-Hicks Contracting Co., for \$19,982; Scott Pl., Medina block pavement, to Aikenhead, Bailey & Donaldson, \$6,405; Stillson St., Medina block pavement, to Wm. H. Sours, 2d, for \$7,583.50; Woodbine Ave., asphalt pavement, to Whitmore, Rauber & Vicinus, for \$8,755.50; Ave. B, asphalt pavement, to the Julius Friedrich Co., \$7,604; Montrose St., brick pavement, to James Ward, for \$6,356.

Troy, N. Y.—The Bd. of Estimate and Apportionment has awarded a contract for paving with granite block on a concrete foundation 25th St., between 3d and 12th Aves., to Dollard & Heeran, 6f Albany, for \$40,517.99. The Bd. has also awarded a contract for resurfacing with bitulithic pavement 7th Ave., between State and Grant Sts., to the Warren Bros. Co., of Boston, Mass., for about \$9,000.

Monroe, N. Y.—The Town Bd. has awarded a contract for the rebuilding of the Quaker Hill Rd. to the Schunemunk Constr. Co., for about \$1,550.

Utica, N. Y.—The Bd. of Contract and Supply received one bid for paving a portion of Schuyler St., 1,060 sq. yds., from the Harry W. Roberts Co., of Utica, as follows: Bitulithic, \$2.20 per sq. yd.; asphaltic concrete, \$1.80; vitrified brick, \$2.25.

Bryan, O.—A contract for the improvement of South Main, East and West Wilson and East High Sts. has been awarded to E. A. Freshwater & Sons, of Chester, W. Va.

Troy, O.—State Highway Comm. J. R. Marker has awarded a contract for building with Trinidad asphalt the third section of the State Highway between Troy

and Piqua to Bigler Bros., of Middletown, for \$38,930. The distance to be paved is 4.15 miles, and the width will be 10 ft.

Zanesville, O.—The contract for paving Woodlawn Ave., Harrison St., Elberon Ave. and Spurch St. has been awarded to Adams Bros.

The Bd. of Co. Comrs. of Muskingum Co. has awarded a contract for 1 mile of paving on the Maysville Pike to A. Emery & Sons.

Harrisburg, Pa.—The State Highway Dept. has awarded contracts for state road work as follows: Clearfield Co., Decatur Twp., Route No. 57, 10,756 ft., Baker-Owen Constr. Co., Johnstown, \$40,791.08; Lehigh Co., North Whitehall Twp., Route No. 163, 16,300 ft., Neff & Horn, Slatington, \$54,992.74; Berks Co., Hereford Twp., 3,048 ft., J. F. Shanley Co., Philadelphia, \$21,576.14; Bucks Co., Falls Twp., 10,115 ft., J. F. Shanley Co., Philadelphia, \$27,331.37; Washington Co., Charleroi Boro., Route No. 118, Hastings & Piper, Charleroi, \$17,907.48; Blair Co., Frankston Twp., 49,394 ft., repair work, H. K. Hinkle & Co., Altoona, \$34,472.05; Mercer Co., East Lackawanna Twp., 9,632 ft., Northwestern Constr. Co., Franklin, \$35,817.09; Mercer Co., Route No. 74, 14,807 ft., South Shore Constr. Co., Erie, \$50,139.50; Jefferson Co., Young Twp., Route No. 63, 13,735 ft., South Shore Constr. Co., \$53,116.39; Northumberland Co., Route No. 161, 40,143 ft., Monroe Paving Co., Longshore, \$142,573.15; Delaware Co., 18,843 ft., G. Ralph Marsh, Philadelphia, \$67,042.80.

Sherman, Tex.—The Grayson Co. Comrs. Court has awarded a contract for the construction of a little over 78 miles of road in the Sherman Precinct to the Larkin Constr. Co., of Dallas, for \$255,019.14.

Culpeper, Va.—At a joint meeting of the Bd. of Supervs. of Culpeper Co. and the Mayor and Town Council representing the town of Culpeper, the Culpeper Constr. Co. was awarded a contract for macadamizing 4.3 miles of street in the town for \$5,949.34.

Wheeling, W. Va.—The Bd. of Co. Comrs. of Ohio Co. has awarded the contract for rebuilding bridges Nos. 1 and 2 along the Greggsville, Clinton and Potomac Pike to John Boyd, and a contract for placing concrete floors in bridges Nos. 3, 4, 5 and 6, on Peters' and Brown's Run Rd., to F. C. Nelson, of Elm Grove.

Fond du Lac, Wis.—A contract for the construction of 20,000 sq. ft. of concrete sidewalk in the village of Campbellsport has been awarded to the Bruett Cement Block Co.

Milwaukee, Wis.—The Dept. of Pub. Wks. has awarded contracts as follows: Lincoln Ave., between 5th and 11th Aves., asphalt pavement, to the Badger Constr. Co., at \$1.58 per sq. yd.; 20th Ave., between Mineral St. and Greenfield Ave., macadam, and Hanover St., between Florida and Virginia Sts., to the D. N. Sneddon Co., at \$1.05 and 99 cts. per sq. yd., respectively; Reed St., between International Ave. and Washington St., and Grove St., between Maple and Rogers Sts., sandstone blocks, to the D. N. Sneddon Co., at \$3.40 per sq. yd.; E Water St., between Michigan and Erie Sts., asphalt resurfacing, to the Badger Constr. Co.

BRIDGES

Bids Asked and Prospective Work

Little Rock, Ark.—The City Council is planning the erection of a 60-ft bridge, consisting of two 30-ft. spans, to cost \$1,100. Address City Clk.

Gilroy, Cal.—The City Council has engaged J. Fisher, of San Jose, to draw plans and specifications for 2 concrete bridges, one to be placed on Monterey St. and the other on Martin Lane.

Southington, Conn.—At a special town meeting held recently the selectmen were authorized to build a new bridge over Eight Mile River, at a cost not to exceed \$1,600.

Cedar Falls, Ia.—It is reported that efforts will be made this fall to secure the construction of another bridge across the Cedar River at this point.

Webb City, Mo.—A petition is being circulated for the construction of a bridge over Center Creek at Lakeside. Address City Engr.

Utica, N. Y.—The towns of Trenton and Russia are to construct a steel arch bridge of 2 spans with concrete approaches and concrete floor on West Canada Creek, at a cost not exceeding \$11,000.

Cleveland, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Cuyahoga Co., until Aug. 24, for furnishing the labor and materials for the erection of steel arch and shoes for the 591-ft. span of the Detroit-Superior bridge over the Cuyahoga River. John F. Goldenbogen is Clk. of the Bd.

Springfield, O.—The Bd. of Co. Comrs. of Clark Co. has instructed County Surveyor Darnell to advertise for the construction of the steel superstructure of the Dodge bridge in Mad River township, or for a reinforced concrete bridge.

Urbana, O.—Plans for a 70-ft. concrete arch bridge across Nettle Creek are being prepared by R. L. Squire, Deputy County Engineer of Champaign Co. Address Bd. of Co. Comrs.

Muskogee, Okla.—Sealed bids will be received by the Bd. of Co. Comrs. of Muskogee Co., at the office of the Co. Clk., until 5 p. m., Aug. 24, for the construction of 12 bridges, from 20 to 42 ft. in length, to be erected in Muskogee Co., or for material for the same as may be decided by the Bd. W. E. Looper is Co. Clk.

Douglasville, Pa.—The Supervs. of Douglass Twp., Berks Co., have decided upon the construction of three concrete bridges.

Franklin, Pa.—Sealed bids will be received by the Bd. of Co. Comrs. of Venango Co. on Aug. 16 for the following: Razing and removing the southerly plate girder span of the Relief bridge over the Allegheny River at Oil City and replacing with a new 90-ft. plate girder with a clear roadway of 19½ ft.; erecting a new bridge on the site of the Emery bridge over Wolf Creek, the new bridge to consist of 5 I-beams encased in concrete. E. K. Smiley is Clk.

Lewisburg, Pa.—Bids will be received by the Bd. of Co. Comrs. of Union Co. until Aug. 19 for the erection of a 3-span plate girder bridge with a vitrified brick roadway, at Milton.

Lock Haven, Pa.—Bids will be received by the Bd. of Co. Comrs. of Clinton Co. until noon, Aug. 23, for the construction of the northward approach to the county bridge between Renovo and South Renovo. The work will include the construction of a brick roadway with reinforced concrete curbs and iron railings. Plans and specifications are on file at the office of the Bd.

Reading, Pa.—Sealed bids will be received at the office of the Co. Controller of Berks Co. until 10 a. m., Aug. 13, for replanking part of the Schuylkill Ave. bridge. D. K. Hoch is Co. Controller.

Bids Received and Contracts Awarded.

Santa Ana, Cal.—The Bd. of Co. Supervs. of Orange Co. has awarded contracts for bridge work as follows: 350-ft. reinforced concrete bridge over the Santa Ana River; bridge at 5th St., 20-ft. roadway, to Chas. Steffen, of San Diego, for \$19,500; reinforced concrete bridge in Tustin to Mercereau Bridge & Constr. Co., Pacific Electric Bldg., San Francisco, for \$7,418.

Montrose, Colo.—The Bd. of Co. Comrs. of Montrose Co. has awarded a contract for 2 new bridges across the Uncompaghe River to the Pueblo Bridge Co., for \$3,700 and \$2,950, respectively.

Charleston, Ill.—The Highway Comrs. of Ashmore and Morgan Twp. have awarded a contract for a bridge to the Decatur Bridge Co.

Galesburg, Ill.—The Bridge Committee of the Bd. of Supervisors of Knox Co. has awarded a contract for a new bridge over Spoon River to the Clinton Bridge & Iron Works, of Clinton, Ia., for \$13,800. The bridge will consist of a 160-ft. steel structure, with a 350-ft. steel approach.

Hopedale, Ill.—The Highway Comrs. of Hopedale Twp. and the Bridge Committee of the Bd. of Supervs. of the county have awarded contracts for repairs to the bridge over the Mackinaw River as follows: Iron work, to the Joliet Bridge & Iron Co., for \$1,584; concrete work, to Ed. Cooney, of Tremont, for \$8.80 per cu. yd.

Des Moines, Ia.—The City Council has awarded the contract for borings at the 7th St. bridge site to John Y. Rose, at a price of 50 cts. per ft.

Cincinnati, O.—The Pothoff Constr. Co. submitted the low bid, \$3,600, for replacing the roadway stringers on the 8th St. viaduct.

Columbus, O.—The contract for the construction of a concrete bridge over the Olentangy river at King Ave., Columbus, has been awarded by the Co. Comrs. to E. L. and C. G. Williams, at \$18,000.

Delaware, O.—The Bd. of Co. Comrs. of Delaware Co. has awarded a contract for the construction of a bridge over Baker Creek to the Delaware Bridge & Iron Co.

Lisbon, O.—The Bd. of Co. Comrs. of Columbiana Co. has awarded a contract for painting the Canton bridge, near the west corporation line of Lisbon, to J. A. Clark, of Negley, for 80 cts. per lin. ft.

Springfield, O.—The Bd. of Co. Comrs. of Clark Co. has awarded bridge contracts as follows: Swisher bridge, south of cable, to Frawley Bros., for \$299; Weaver bridge, to Freyhoff & Powell, for \$249.50; bridge in Johnson Twp., to Fred Nagel, for \$355.91; Crayon bridge, in Concord Twp., to Chas. Nagel, for \$198.75.

Youngstown, O.—The Bd. of Co. Comrs. of Mahoning Co. has awarded a contract for the construction of the abutments of the Raccoon Creek bridge to L. H. Young, of Mineral Ridge.

Providence, R. I.—The State Bd. of Pub. Roads has awarded bridge contracts as follows: T. J. Hynes & Son, of Wales, Mass., as follows: Smithfield, 24-ft. bridge, \$1,360; Kenyon, 40-ft. bridge, \$3,530; North Smithfield, 10-ft. bridge, \$1,150; Moose Neck bridge, West Greenwich, 21 ft., \$1,750; Millville bridge, Exeter, 10 ft., \$830; Beaver River, Richmond, 15 ft., \$1,960; Foster, 15 ft., \$710; Cranberry bridge, Plainville Pike, 8 ft., \$375; Clayville Brook bridge, \$630; Buck's Horn bridge, Coventry, 18 ft., \$1,225; Portsmouth bridge, 19 ft., \$430.

Dallas, Tex.—The Midland Bridge Co. has received a contract for building a 100-ft. steel bridge across Denton creek on the Coppell road, at \$2,147.

New London, Wis.—The contract for the construction of a new steel bridge across Wolf river has been awarded to the Worden-Allen Co., of New London.

Milwaukee, Wis.—The Bd. of Co. Comrs. of Milwaukee Co. has awarded the contract for grading and paying the east approach to the new Grand Ave. viaduct to E. C. Blake, at 65 cts. per cu. yd. for grading and 90 cts. per sq. yd. for brick paving.

BONDS

Paragould, Ark.—The City Council has passed the initiatory ordinance creating a paving district for the purpose of issuing bonds to pave the principal streets of the city. The total cost of the improvement will be about \$100,000.

Carpinteria, Cal.—A bond issue of \$25,000 has been voted in Carpinteria and Summerland.

Belleville, Ill.—A bond issue of \$2,500 has been voted for the construction of bridges.

Lawrenceville, Ind.—Lawrence Twp. has voted for the improvement of 36 miles of road, carrying with it besides a tax levy a bond issue of \$35,000.

New Iberia, La.—It is reported that bonds to the amount of \$180,000 are to be voted in Iberia Parish in the near future.

West Plains, Mo.—Bonds to the amount of \$30,000 has been voted for the construction of rock roads. Address the Howell Co. Clk.

Beatrice, Neb.—The City Comrs. have called a special election for Aug. 20 for voting on the issuance of bonds to the amount of \$11,000, to provide funds for the paving at intersections in Paving District No. 1.

Cincinnati, O.—The City Council has passed an ordinance providing for the issuance of bonds in the sum of \$28,500 for the purpose of providing funds to pay the city's portion of the cost of improving Harlem Pl., Rice St., Durrell Ave., Snabley alley, Wingate alley and Martha St.

The Council has also passed an ordinance providing for the issuance of bonds to the amount of \$120,000 for the purpose of paying the city's portion of the cost of improving portions of the following streets: Stuart Ave., W. 8th Ave., Erie Ave., Colburn Ave., Liberty St., Court St., Neff Ave., Knox St., Spring St., Neave St. and Iowa St.

An ordinance providing for the issuance of bonds to the amount of \$500,000

for the repair and resurfacing of streets in all sections of the city has been passed by the City Council.

Columbus, O.—The City Council has passed ordinances providing for the issuance of bonds in anticipation of the collection of special assessments for the improvement of portions of the following streets: Lasell, Chapel, Capital, Spring, Naghten, Hamlet, Lincoln, Starling, Seibert and 6th St.; Jenkins and Eldon Aves.; Lake alley and the alley west of Wilson Ave., between Capital and Lake alley.

The City Council has passed an ordinance providing for the issuance of bonds amounting to \$18,000 in anticipation of the collection of special assessments for the improvement of Woods Ave., between 4th St. and Parsons Ave.

Dayton, O.—Sealed bids will be received until Aug. 29 for the sale of bonds amounting to \$70,500 to provide funds for the paving of portions of Phillips and Burkhardt Aves. and N. Main St. G. W. Bish is Audr.

Nottingham, O.—Bids will be received on Aug. 19 for the purchase of paving bonds amounting to \$3,500. J. C. Steinicke is Clk.

Sandusky, O.—Sealed bids will be received at the office of Fred W. Bauer, City Audr., until Aug. 15, for the purchase of bonds amounting to \$10,000 for the construction of pavements and curbing on Taylor St. and in Huron Ave.

Troy, O.—Thirty-one thousand dollars in bonds has been voted for paving streets. Address City Clk.

East McKeesport, Pa.—The voters of East McKeesport Borough have voted to increase the bonded indebtedness of the borough by \$60,000, of which \$29,000 will be used for sewers and street improvements.

Pittsford, Pa.—The voters of the Boro. of Pittsford have voted favorably on the proposition of issuing bonds to the amount of \$32,000 for paving, grading and other street improvements.

Rockwood, Pa.—A bond issue of \$5,000 has been voted at a special election.

Ablene, Tex.—An issue of \$30,000 street improvement bonds has been voted. The proceeds of the bond issue will be used to connect the paved streets of the city with the macadam roads built up to the city limits.

Bastrop, Tex.—The Attorney General's Dept. has approved a road bond issue of \$80,000 for Road District No. 2, which includes the town of Bastrop.

El Paso, Tex.—A proposition to issue bonds amounting to \$150,000 to provide funds for the construction of a road from Fabens to Fort Quitman will be submitted to the voters on Aug. 27.

Ferris, Tex.—An election will be held Aug. 17 to decide the question of issuing \$100,000 road district bonds. Address City Clk.

Gonzales, Tex.—The Attorney General's department has approved a \$150,000 good roads bond issue recently authorized by the voters of Gonzales Co.

Nacogdoches, Tex.—The Attorney General of the state has approved an issue of \$30,000 street improvement bonds.

Paris, Tex.—An election will be held August 17 to decide the question of issuing \$100,000 good road bonds. Address City Clk.

Taylor, Tex.—The recent election to decide on the issuance of \$25,000 in bonds for street paving was carried by a large majority.

Venus, Tex.—Good roads bonds to the amount of \$75,000 have been voted by the Venus Precinct of Johnson County at a recent special election. The money will be used in constructing and maintaining a system of about 30 miles of pike roads.

Mount Morris, N. Y.—A contract for oiling the state road between Dansville and Avon, a distance of about 30 miles, has been awarded to Wm. McCarthy and Philip Wall, of Mt. Morris.

Columbus, O.—Sealed bids will be received by S. A. Kinnear, Director of Pub. Service, at City Hall, until noon, Aug. 13, for furnishing approximately 200,000 street paving blocks, in accordance with the 1912 standard street paving specifications, part to be of the standard size of 3½x4x8½" and part of the old size of 3¼x4x9".

Elyria, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Lorain Co. at the office of the Bd. in the Court House, Elyria, until 10 a. m., Aug. 12, for furnishing 2,000 cu. yds. of slag for the repair of roads in Camden Twp., delivered on tracks at Kipton Station and for 1,600 cu. yds. of slag for the repair of roads in Brighton Twp., to be delivered on tracks in Wellington Station. F. L. Ellenberger is Clk. of the Bd.

STATE OF MARYLAND, STATE ROADS COMMISSION,

532 N. Howard St.,
Baltimore, Md.

NOTICE TO CONTRACTORS

Sealed proposals for building to sections of State Highway aggregating about 23.66 miles in length, as follows:

Baltimore County: One section along the Baltimore-Washington Boulevard, from the B. & O. R. R. Crossing at Morrell Park southerly for a distance of about 1.50 miles (Pitch Macadam).

Charles County: One section along the road from Tompkinsville to Rock Point, about 4.75 miles in length (Concrete road-bed with bituminous wearing surface).

Dorchester County: One section along the Hurlock-Shiloh Church Road, about 1.42 miles in length (Macadam). One section along the Cambridge-Mt. Holly Road, about 3.05 miles in length (Stone surfacing).

Kent County: One section along the Kennedyville-Locust Grove Road, about 1.29 miles in length (Macadam).

Prince George's County: One section along the Baltimore-Washington Boulevard from Main Street, Laurel to Crow Run, about 0.62 miles in length (Pitch macadam).

Queen Anne's County: One section along the Centreville-Wye Mills Road, about 2.50 miles in length (Macadam). One section along the Centreville-Wye Mills Road, about 4.60 miles in length (Macadam).

Talbot County: One section along the Easton-Wye Mills Road, about 1.44 miles in length (Macadam).

Wicomico and Dorchester Counties: Approaches to the Nanticoke Bridge, between Wicomico and Dorchester Counties, at Sharptown, will be received by the State Roads Commission at its offices, 534 N. Howard Street, Baltimore, Md., until 12 M. on the 13th day of August, 1912, at which time and place they will be publicly opened and read.

Bids must be made upon the blank form contained in the book of specifications, which will be furnished by the Commission upon application and payment of \$2.00 for each section. Blue-prints of each section will be furnished at the rate of 25 cents for each half mile.

No bids will be received unless accompanied by a certified check for the sum of Five Hundred (500) Dollars, payable to the State Roads Commission.

The successful bidder will be required to give bond, and comply with the Acts of the General Assembly of Maryland, respecting contractors.

The Commission reserves the right to reject any and all bids.

By order of the State Roads Commission, this 29th day of July, 1912.

O. E. WELLER, Chairman.

WM. L. MARCY, Secretary.

MISCELLANEOUS

St. Louis, Mo.—Bids will be received by the Bd. of Pub. Improvements until noon, Aug. 13, for the construction of a granite sidewalk at the city hospital.

The business men having in charge the St. Louis Fair have requested the Co. Court to cooperate with them in the preparation of a first-class road leading to the fair ground before the opening of the fair, Sept. 23.

FOR SALE

10 Ton Buffalo-Pitts Road Roller
22 H. P. Buffalo-Pitts Traction Engine
6-Six Yd. Spreading Cars

JAS. S. BRADEN

26 CORTLAND STREET, NEW YORK

GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, AUGUST 17, 1912

Number
7

Association of Connecticut Road Officials

At a meeting of the road officials of Connecticut cities held at New Haven on July 22, a society to be known as the Association of Connecticut Road Officials was temporarily organized.

The meeting was called to order in the aldermanic chamber by W. Scott Eames, Director of Public Works of New Haven, at 11:30 a. m. After some preliminary discussion on paving matters, during which traffic records taken on New Haven streets during the present summer were considered, the meeting adjourned for dinner and an automobile inspection trip. Later, in the afternoon, the meeting reconvened and elected temporary officers as follows: President, W. Scott Eames, Director of Public Works, New Haven; Secretary, Charles J. Bennett, Superintendent of Streets, Hartford; Executive Committee: Alfred H. Terry, City Engineer, Bridgeport; James H. MacDonald, State Highway Commissioner, Hartford; Robert E. Mitchell, City Engineer, Willimantic; Fred. L. Ford, consulting engineer, New Haven, and Charles J. Bennett, Superintendent of Streets, Hartford.

A feature of the conference was the inspection trip by automobile over about 30 miles of New Haven streets. In each automobile there was a man from the Department of Public Works or from the City Engineer's office, equipped with a small map of New Haven on which the route had been laid out. Each visiting delegate was also furnished with typewritten sheets describing the route, the points of interest along it and the pavements on the streets over which it passed. The description of the pavements contained considerable detailed information regarding the kind of pavement, its cost, the date of construction, etc. The pavements included wood block, vitrified brick, macadam, rock asphalt, bituminous macadam, bitulithic, granite block, Hassam, "Asphalto" and granitoid.

Director of Public Works Eames of New Haven, to whom we are indebted for our information regarding the conference, advises us that circular letters containing an account of the first conference, an outline of the purposes of the association and an invitation to become a member of it will be sent to each town, borough and city official in Connecticut, as well as to officials of all the automobile associations in the state. He believes, he states, that before Jan. 1, 1913, the organization will have several hundred members and that it will accomplish a great work for Connecticut roads and pavements through cooperation and the interchange of data on costs, methods of construction, etc., among the various members, who will be the officials, directly or indirectly charged with the responsibility for road and street construction and maintenance within the state.

The objects of the association, as formally set forth, are to consider the following specific subjects relating to road construction, maintenance, lighting and cleaning:

1. The advisability of an interchange of cost data on road construction and maintenance, based on a uniform method of accounting and cost per square yard for original construction, maintenance and cleaning.

2. The taking of traffic statistics at uniform radial distances from the city hall, or central portion of each city, commencing on the main arteries two or three miles out and then at each half mile point on the same roadways working toward the center, the statistics to be taken and classified on standard sheets to be adopted after consultation of the road officials.

3. To consider whether it is desirable or necessary to increase the depth and strength of the foundation of all pavements to meet the 10-ton or larger automobile trucks, which are already here, and which will rapidly increase in number and possibly in weight, during the next few years.

4. To consider whether it is practicable or advisable to urge the adoption of a standard of wheel or body width for automobile trucks, in order that the width between curbs on curbed streets can be properly determined, and especially whether on the outlying streets the hardened roadways should be increased in width, in order that fast moving vehicles can meet and pass with greater safety without encroaching on the softer roadway shoulders, and if considered advisable to take action upon this matter, how the improvements can best be brought about, whether through consultation with automobile manufacturers, or associations, or by legislative action.

5. Whether it is advisable to prohibit or regulate the use of chains on automobile tires. Kimberly and Howard Avenues, in New Haven, were put in first-class condition last year, at an expense of over \$8,000, and the injury to these two streets, during the wet fall and rainy spring seasons from chains on automobiles was very great. A great many of these were out of town cars, passing between New York and Boston. If the use of chains is prohibited, should the towns and cities attempt to furnish a substitute by using more sand and stone screenings on the oil roads and smooth surfaced pavements?

6. Should the weight and strength of all manhole covers, sewer, telephone, electric light, etc., be increased to meet the increasing weight of automobile trucks?

At a second conference, which will be held early in September either in Hartford or Bridgeport, the association will be permanently organized, and will include not only officials of the nineteen cities invited to participate in the first conference but also selectmen, road superintendents, road commissioners, members of paving commissions, city engineers, directors of public works and other officials in both towns and boroughs as well as cities.

New Bridges in Philadelphia

Contracts have recently been awarded in Philadelphia for the construction of four bridges at an aggregate cost to the city of \$135,000.

Two of these bridges will span the tracks of the Philadelphia, Baltimore and Washington Railroad in West Philadelphia. One will be constructed at 65th street and the other at 72d street. Both spans will be of reinforced concrete, similar in design and construction to the bridge recently built at 62d street. The central span of each bridge will be 60 ft. in length with two additional spans of 20 ft. each, which will allow the laying of additional railroad tracks underneath if necessary. Each bridge will be 70 ft. wide.

One-half the cost of constructing these two bridges will be borne by the railroad company and the other half by the city. The city will pay the entire cost of constructing the other two bridges, one of which will be a foot bridge over the North Penn Railroad at Montgomery street, and the other, a similar structure, at Glenwood avenue over the Philadelphia, Germantown and Norristown Railroad.

Rapid Progress in Road Building in the Borough of Queens

The progress which has already been made on the new road system planned for the Borough of Queens, New York City, is the basis for the belief of Borough President Connolly, that the entire 110 miles or more of improved bituminized surfaced highways now being built under the \$2,000,000 appropriation, recently authorized by the Board of Estimate and Apportionment, will be completed before November of this year. Sixteen miles of roadway have already been completed and the different contractors at work on the various sections are more than doubling the capacity of their plants in Queens. It is estimated that by the end of this month the work will progress at the rate of one mile per day.

Sections already completed are as follows: One and a half miles on the Merrick road from Fulton street, Jamaica, to a point 1,500 ft. south of Central avenue; 3 miles of Central avenue, from the Merrick road to the Nassau County line; 3½ miles of Hempstead and Jamaica Turnpike from Grand street, Jamaica, to Nassau County line; 1 mile of College Point Causeway from Broadway, Flushing, to 13th street, College Point; ½ mile on Woodhaven avenue between Fulton street, Woodhaven, and the Forest Park Driveway; ½ mile of Cooper avenue, Glendale; 1 mile of Central avenue, Far Rockaway; 2 miles of Rocky Hill road, Flushing; 2½ miles of the Flushing-Astoria road between the Long Island City line and Ehrets lane.

Work has begun on Thompson avenue, and Jackson avenue, from Shell road to Flushing Creek, about 1 mile, which is being paved with granite block, is half finished. Shell road, which is being paved its entire length with bituminous concrete, has been completed for about ½ mile, and about ¾ mile of bituminous concrete has been laid on Allsop street and Rockaway road, Jamaica Village.

Owing to the great amount of work being done on all these principal highways, which are temporarily closed to travel, a list of alternative routes for the benefit of people going out on Long Island has been prepared by Borough President Connolly and Highway Commissioner G. Howland Leavitt.

Concrete Roads in Minnesota

Work will commence within a short time on the construction of the first long stretches of concrete roads to be built in Minnesota under the so-called Elwell law. Contracts for three state rural roads were awarded recently by the County Board of Winona County, covering a total of 16 miles, and costing approximately \$116,000.

It is estimated that approximately 11 miles of roads will be completed by fall if the present plans and specifications are carried out. A large number of cement manufacturers, highway officials of different boards and others interested in road construction have visited the city of Winona during the past few days in connection with the completing of the preliminary work of improvement.

It is believed by some of the contractors that the Winona County roads will be patterns for the remaining roads to be built in the state.

New Civil Service Regulations in Philadelphia

The City Civil Service Commission of Philadelphia has decided to require applicants for the position of street paver to give a demonstration of their ability in actual labor on the public streets. Work done in such exhibits will not be included in wages after the applicant has been awarded a position.

Refuses to Accept Contract

The Modern Steel Structural Co., of Waukesha, Wis., has refused to accept contracts for which the company was a successful bidder a little over two months ago for the construction of Mississippi River bridges at Plymouth avenue and 42d avenue N., Minneapolis. The firm bases its refusal upon the rise in the price of steel since its bid was submitted.

At a meeting of the special council committee on new bridges, held early in August, F. W. Harding, Vice President of the bridge company, was present, and stated that it would be utterly impossible to accept the contract, not only on account of the advance in the price of steel, but because the mills refuse to accept orders for the delivery of steel during the present year. He blamed the Council for the delay of two months in considering the bids and allowing the contract. Alderman M. P. McInerney, chairman of the committee, declared that the blame for the delay lay not upon the City Council but upon the bidder, whose design did not, in every way, comply with the City Engineer's specifications.

Mr. Harding said that his company's contract with the rolling mills expired July 1, and since that time the mills have refused to accept orders for metal for delivery before January 1, 1913. He stated that the bid for the contracts had been made with the expectation of being able to buy the steel under the old contract.

City Attorney Daniel Fish advised the committee to authorize the contracts in accordance with the figures submitted in the company's bid, and to proceed in the usual way when the bidders refuse to comply with the provisions of the bid. This would mean that the city would retain the certified check for \$1,500 which accompanies the bid.

Street Crevasses in Long Island City

The discovery was recently made that in North and South Jane streets, Long Island City, on the north and south sides of the Queensboro Bridge Plaza and under the Plaza itself, are two large crevasses, four to twelve ft. wide and 20 ft. deep, extending for a distance of five or six blocks, over which the concrete pavement, forming a hollow arch, constituted the entire support to the heavy traffic continually passing over those streets.

When discovered the pavement had already sunk perceptibly, and it was estimated that a big cave-in, with possible loss of life, would have ensued if the discovery had not been made when it was.

Highway Commissioner Leavitt, of the Borough of Queens, after a consultation with President Maurice E. Connolly, proceeded at once to tear up the thick concrete pavement for a distance of four blocks on North Jane street, stopping all traffic until the street should be made safe.

A temporary entrance was provided for the large manufacturing plants and office buildings which front on the street until the bridge opening is filled. It is estimated that the cost of repairing and filling up the crevasses may reach \$50,000.

The crevasse was discovered by a contracting firm which was laying water mains through the street. In the course of excavation they came upon the subterranean passages.

The crevasses seem to be the result of the general sinking away of the earth that was used to fill in that section at the time the Queensboro Bridge was built, and it is said that the trouble has been aggravated by leaks in some of the city water mains. For some time pedestrians have noticed that heavy trucks going along over Jane street have produced a hollow sound.

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AUGUST 17, 1912.

Plant Trees Along Oklahoma Highways

The women of Sapulpa, Okla., who recently organized for city and county improvement and advancement have determined to plant pecan, walnut and hickory trees on both sides of a road now being constructed through Creek County, basing their action on the theory that two pecan trees placed in the back yard of a homestead will pay the taxes on the property. They believe that when the trees begin to bear they will provide a fund large enough for the maintenance of the road.

In two other cities of Oklahoma, Anadarko and Guthrie, women have organized as auxiliaries to commercial clubs and chambers of commerce for the purpose of promoting outside interest in their respective cities.

Plan Arcade Walks in St. Paul

G. H. Herrold, Assistant City Engineer of St. Paul, Minn., has prepared plans for arcade sidewalks in Robert street between 4th and 6th streets.

According to Mr. Herrold's report the narrow streets of St. Paul may be widened from 20 to 24 ft. by the use of the arcades and the width of the driveway on Robert street would be increased from 35 to 54 ft. between curbs. Building fronts would not be affected above the first floor, which would be moved back about 12 ft.

For architectural effect the supporting columns on the buildings would be replaced by columns of uniform design throughout the two blocks. Ornamental lampposts would be replaced by supporting columns. It is stated that the cost would be comparatively small.

To Rebuild the Boston Post Road

Plans are being made by the State Superintendent of Highways of New York and the State Highway Commissioner of Connecticut for the rebuilding of the old Boston post road, running from the town of Pelham, through New Rochelle, Mamaroneck and Rye, N. Y.

C. Gordon Reel, State Superintendent of Highways of New York, has stated that the contract for this work will be awarded in the near future and State Highway Commissioner James H. MacDonald, of Connecticut, has already outlined his plans for the improvement of the Boston post road through Connecticut.

Good Roads Meeting in Phillips Grove, W. Va.

The Good Roads Association of Marshall, Ohio, and Marion Counties, W. Va., held its annual convention at Phillips Grove, W. Va., August 7. It is estimated that nearly 3,000 people attended the meeting, which was held out of doors. A well-arranged program was carried out. Speaking commenced at 1.30 p. m.

Arthur Gray, of the Marshall County Good Roads Association called the meeting to order and introduced W. E. Ice, who spoke on the needs of West Virginia in the matter of road construction. Mr. Ice was followed by Dr. H. D. Hatfield, Republican candidate for governor of West Virginia, who outlined methods by which, in his opinion, the good roads cause could be advanced in the state. Dr. Hatfield favors the enactment of a comprehensive state road law, providing for the appointment of honest and competent citizens on a state road commission with power to lay out and construct, in conjunction with the county road officials, connecting roads between all important cities and towns. He also favors the adoption of a system for raising funds to build these roads which will work out a fair and equitable distribution of the cost between the state, counties and districts. He said that a levy based upon the assessment of 1909 of ten cents on every \$100 would pay for a complete system of improved roads in West Virginia in less than three years. Dr. Hatfield also advocates the use of convict labor in building roads, particularly favoring the working of those prisoners who have been sentenced to short terms. He was followed by George A. Laughlin, of Wheeling, and Charles P. Light, Field Secretary of the American Association for Highway Improvement, who made the concluding address of the day.

New Viaduct in Cincinnati

According to the estimate of Kraps & Brehm, the contractors who are constructing the Gilbert avenue viaduct in Cincinnati, the structure will be thrown open for traffic by December 1 of this year.

This announcement is of particular interest to residents of Walnut Hills, Norwood, Hyde Park, Evanston and Madisonville, who will save considerable time in transit between their homes and their business. In addition to this, the dangers of the Court street grade crossing will be eliminated.

The structure will be built entirely of steel and concrete, and will be composed of a series of arches, some narrow and some wide and all located so as to present an architectural symmetry throughout the whole length. The bridge has been contemplated for years. It will be 1,100 ft. long when finished and will cost approximately \$1,000,000.

The University of Georgia, which has recently undertaken the work of furnishing free engineering advice on road building questions, through a department of roads, is receiving many calls for such services from county road officials and others.

It is said that the recent rains in Allegheny County, Pa., have caused damage to roads, bridges and culverts to the extent of \$35,000. County Commissioners J. Denny O'Neill, J. K. Campbell and S. J. Toole, with John S. Gillespie, Superintendent of Roads, recently made a tour of the roads in Elizabeth and Forward townships, where the washouts were most serious. The engineers report that it would cost the county \$25,000 to resurface the roads and \$10,000 to replace culverts and bridges. The principal damage in Forward and Elizabeth townships was on the Douglass Hollow, the Lovedale Hollow, the Pangburn and the Roberts Hollow roads.

Coming Meetings

Aug. 27-29.—League of Third Class Cities of Pennsylvania.—Annual Convention, Wilkesbarre, Penn.

Aug. 27-29.—Union of Canadian Municipalities.—Annual Meeting, Windsor, Canada. Secy.-Treas. W. D. Lightall, 305 Quebec Bank Bldg., Quebec, P. Q.

Sept. 2-7.—International Association for Testing Materials.—Sixth Congress, Engineering Societies Bldg., 29 W. 39th St., New York, N. Y. Secy., H. F. J. Porter, 29 W. 39th St., New York, N. Y.

Sept. 30—Oct. 5. — American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

The City Council of Regina, Saskatchewan, is purchasing property at a cost of \$225,000 for the opening of a new street to parallel the Central Pacific Railroad near the new Broad street subway.

Considerable road improvement is now in progress in McLennan County, Tex. In the McGregor precinct of that county \$100,000 is being spent and a movement is on foot to issue that same amount of bonds for the Waco precinct.

Horseham Township, Montgomery County, Pa., has erected 150 road signs in accordance with the proposal recently made by the Good Roads Committee of the Automobile Club of Philadelphia. This is the fourth township which has adopted this plan in Pennsylvania.

It is stated that the New York State Department of Highways contemplates asking for bids for the improvement of approximately 300 miles of highway within a short time. This budget will use up the last of the \$50,000,000 which the department has now at its disposal. The question of a new \$50,000,000 bond issue will be decided by the voters at the coming election.

Arrangements are being made by the commissioners' court of Gonzales County, Tex., for starting construction on the proposed system of good roads in Precinct No. 1 of that county, which will involve an expenditure of about \$150,000. Bonds in that sum have already been issued for the purpose. The engineering work for the proposed roads is being done by J. C. Tipps and S. H. Burchard of Gonzales.

The new Dillingham street bridge across the Chatahoochee River in Columbus, Ga., has been formally thrown open to traffic and is now in use. The bridge is a concrete structure of the Milan type and was designed by a New York engineering company and erected under the supervision of W. Cooper Campbell, a local engineer. It connects Columbus with the city of Girard, Ala., and was erected at a cost of \$175,000.

Concrete is to be used in the construction of a motor road between Toronto and Hamilton, Ontario. There are 150 miles of roads in the county system, and the annual cost of new construction and maintenance runs between \$35,000 and \$50,000. The road superintendent has worked out a plan whereby an annual expenditure of \$32,000 for 30 consecutive years would cover the entire county with 200 miles of concrete roads, which would cost less than \$500 annually to preserve.

The city authorities of Charlotte, N. C., recently stationed a special officer at the East Ave. crossing of the tracks of the Seaboard Air Line and the Southern Railway for the purpose of making a list of the trains crossing the street. The purpose of the city is to claim a forfeit of \$50 per day and impose a separate fine for each car or engine operated across the street, as provided in an ordinance to cover the failure of the railroads to begin the construction of a proposed subway under the street by a certain date.

Building Commissioner Rapp, of Cincinnati, has suggested to the Park Commission a plan for extending Madison road west from its present western terminus at Woodburn avenue, 1,500 ft. to Ashland avenue. Commissioner Rapp proposes the construction of a boulevard having a 70 ft. roadway with parkings 45 ft. wide on either side. The park commissioners have expressed themselves as favorable to the plan, but declare that lack of funds will prevent their taking up the matter at the present time.

Plans for constructing the international road between Duluth, Minn., and Port Arthur, Ont., are rapidly nearing completion. Both Cook and Lake Counties in Minnesota, through which the Minnesota end of the road will pass, have made appropriations for the construction of the road on this side of the border and work will begin there within a very short time. It is said that St. Louis County will probably not build a special road, but connection will be made with a good road which will be improved. Nearly one-half of the Canadian end of the road, 60 miles, is either completed or already in course of construction.

Personal Notes

Mr. A. B. Heddon has resigned from his position as assistant city engineer of Reading, Pa.

George S. Hartshorn, City Engineer of Woburn, Mass., died at his home in that city, August 3.

F. W. Proctor, of Cambridge, Mass., will succeed Elwin Warner as Assistant City Engineer of North Adams, Mass.

C. H. Johnson, for several years Assistant City Engineer of Columbus, Ga., has resigned and is now engaged in the general contracting business in that city.

Joseph W. Shirley, Chief Engineer of the Topographical Survey Commission of Baltimore, Md., has been appointed a member of the City Planning Commission of Baltimore.

Newton B. Wade, formerly assistant engineer of drainage investigation in the United States Department of Agriculture, has been appointed City Engineer of Millville, N. J.

Earl M. Seitz, formerly treasurer of the Lane Paving Co., Atlantic City, N. J., has severed his connection with that firm to become manager of the Garden State Construction Co., Camden, N. J.

John Henry Schaeffer, Assistant Engineer of the Topographical Bureau of the Borough of Bronx, New York City, died at his home, August 6. Mr. Schaeffer had been connected with the engineering department of New York for many years.

Elwin S. Warner has been appointed Town Engineer of Greengeld, Mass., to fill the vacancy occasioned by the resignation of H. G. Chapin. Mr. Warner has been assistant city engineer of North Adams, Mass., for two years past.

CONTRACT NEWS

CONTRACTS PENDING

ROADS AND STREETS.

Date of letting.	Reported in	Issue of
8-19 Sedalia, Mo., brk & Concrete pav.	8-10	8-10
8-19 Camden, N. J., paving.	8-10	8-10
8-19 Lisbon, O., road work.	8-10	8-10
8-19 Toledo, O., road work.	8-10	8-10
8-19 Los Angeles, Cal., road imp.	8-17	8-17
8-19 Columbus, O., pav. & grad.	8-17	8-17
8-19 St. Bernard, O., stone sidewalks.	8-17	8-17
8-19 Marcus Hook, Pa., paving.	8-17	8-17
8-20 Green Bay, Wis., gravel road.	8-17	8-17
8-20 Duquoin, Ill., paving.	8-17	8-17
8-20 Pine Bluff, Ark., vit. br. or creos.	8-17	8-17
8-21 Port Arthur, Tex., paving.	8-17	8-17
8-22 Jasper, Ala., grad. & draining.	8-17	8-17
8-22 Jasper, Ala., road work.	8-10	8-10
8-22 Columbus, O., road work.	8-17	8-17
8-22 Cincinnati, O., road inpt.	8-17	8-17
8-28 Talladega, Ala., grading, drain. gravel, etc.	8-17	8-17
8-28 Rushville, Ind., macadam road.	8-17	8-17
8-28 Birmingham, Ala., road work.	8-10	8-10
8-31 Newark, O., grading.	8-17	8-17
9-12 Shreveport, La., road work.	8-10	8-10

BRIDGES.

8-19 Chillicothe, O., bridge.	8-17	8-17
8-19 Lewisburg, Pa., plate girder br.	8-10	8-10
8-20 Chattanooga, Tenn., 2 conc. bdgs.	8-17	8-17
8-21 Harvey, Ill., conc. abut.	8-17	8-17
8-21 Cleveland, O., bridge work.	8-17	8-17
8-23 Findlay, O., steel bridge.	8-17	8-17
8-23 Lock Haven, Pa., br. approach.	8-10	8-10
8-24 Cleveland, O., steel arch bridge.	8-10	8-10
8-24 Muskogee, Okla., 12 bridges.	8-17	8-17
8-26 Los Angeles, Cal., bridge.	8-17	8-17
8-30 Columbus, O., bridge substr.	8-17	8-17
8-30 Ashdown, Ark., bridge.	8-17	8-17
9-2 Chatham, Va., 2 bridges.	8-17	8-17
9-4 Tallulah, La., 3 bridges.	7-27	7-27

MISCELLANEOUS.

8-19 Chicago, Ill., 3 plate girder spans.	8-17	8-17
8-19 Youngstown, O., bonds.	8-17	8-17
8-19 Nottingham, O., bonds.	8-10	8-10
8-26 E. Youngstown, O., bonds.	8-17	8-17
8-26 Hamilton, O., bonds.	8-17	8-17
8-27 Springfield, O., bonds.	8-17	8-17
8-27 Toledo, O., bonds.	8-17	8-17
8-29 Dayton, O., bonds.	8-17	8-17
8-30 Mt. Gilead, O., bonds.	8-17	8-17
8-30 W. Mansfield, O., bonds.	8-17	8-17
8-31 Newark, O., bonds.	8-17	8-17
9-2 Delta, O., bonds.	8-17	8-17
9-3 Baltimore, Md., bonds.	8-17	8-17

ROADS AND STREETS

Bids Asked and Prospective Work.

Jasper, Ala.—Bids will be received by the Court of Co. Cmrs. of Walker Co. until Aug. 22, for grading and draining part of the Jonesboro Road beginning at Frogague Creek.

Talladega, Ala.—Bids will be received by the Court of Co. Cmrs. of Talladega Co. until Aug. 28, for grading, draining and surfacing with gravel, part of the Talladega and Mardisville Road.

Jonesboro, Ark.—Vitriified brick will be used on South Main St. for paving purposes, as far as the Methodist Church. The paving material for the rest of this long artery of travel is to be determined later.

Pine Bluff, Ark.—The Commissioners of Paving District No. 29, City of Pine Bluff, will receive bids until Aug. 20 for the construction of approximately 25,000 sq. yds. of vitriified brick or creosote wood block paving, and 2,000 lin. ft. of curb, according to plans and specifications on file at office of F. R. Allen, City Engr.

Los Angeles, Cal.—The Bd. of Pub. Works has asked authority from the City Council to expend \$11,275 from harbor improvement bond moneys for paving with asphalt 44,160 sq. ft. on Canal St., Wilmington.

Bids will be received by the Bd. of Spvrs. of Los Angeles Co. up to 2 p. m. Aug. 19 for improving the Valley Road. The approximate quantities are: 3,900 cu. yds. of excavating; 5,478 lin. ft. of shaping road bed; 3,825 tons of macadam; 90.1 cu. yds. of concrete; 7,739 lbs. of steel; 69.9 ft. of pipe railing, and 112 ft. of 18-in. reinforced concrete pipe.

Orange, Cal.—The City Engr. is drawing plans for the construction of approximately one and a half miles of asphalt pavement on the following streets: East Chapman St., from the city limits to Water St., and Glassell St., from city limits to city limits.

San Francisco, Cal.—The Bd. of Pub. Works has granted permits for street work at the following locations, the expense to be borne by the property owners: Curbs and bituminous pavement in Clement St., near 17th Ave.; sewers, etc., in 29th Ave., between Anza and Balboa Sts.; asphalt pavement in Poplar Alley, between 24th and 25th Sts.; grade and asphalt pavement in Cuvier St.; curbs and asphalt pavement in Anza St., between 19th and 20th Aves.; sidewalks, culverts and asphalt pavement at crossing of Willard and Carl Sts.; curbs and asphalt pavement in Noriega St., between 10th and 11th Aves.; curbs and bituminous pavement in Balboa St., between 24th and 25th Aves.; curbs and bituminous pavement in 21st Ave., south of Geary St.; grading, sidewalks and asphalt pavement at crossing of Ney and Grant Sts.; bituminous pavement on 13th Ave., between Anza and Balboa Sts.

The Bd. of Pub. Works has granted permits for street work at the following locations, the expense to be borne by the property owners: Grading, curbs, basalt and cobblestone pavement and sewers in 23d St., between Hoffman and Grand View Aves.; grading and asphalt in Lisbon St., between Brazil and Excelsior Aves.; curbs, regrading and asphalt pavement in east side of Edinburgh St., between Persia and Russia Aves.; grading curbs and asphalt pavement in 19th Ave., between California and Lake Sts.; asphalt pavement, curbs and reconstruct catch basins at intersection of 30th and Noe Sts.; curbs and bituminous pavement in south side of Geary St., between 7th and 8th Aves.; grading, curbs and asphalt pavement in Maynard St., between Grant and Congdon Sts.; curbs, asphalt pavement with basalt center in 18th Ave., 325 ft. north of Fulton St., and same in 16th Ave., 150 ft. north of Fulton St.; curbs and bituminous pavement in Cabrillo St., between 11th and 13th Aves., provided certain sewers are constructed.

Duquoin, Ill.—The contract will probably be let Aug. 20 for paving several streets.

Elgin, Ill.—The assessment roll for the St. Charles St. paving aggregates \$35,800.

Freeport, Ill.—Preparations for paving East Peru St. will soon be under way, it is believed, from the fact that last week a survey was made by C. E. Parker, City Engr.

Ordinances have been passed for the construction of sidewalks on Walnut, Adams and Oak Sts., and on Schaffer, Harlem and Bailey Aves.

Lanark, Ill.—The City Council of Lanark has decided to build a half mile of concrete pavements, at a cost of \$15,000.

Normal, Ill.—The Bd. of Loc. Imps. is advertising for bids on the pavement, water main and sewer on West Willow St., from Normal Ave. to University St., and south on University St. from the present pavement to Locust St.

The Bd. of Loc. Imps. will soon advertise for bids for paving several streets. Address Pres. of Bd.

Ft. Wayne, Ind.—The Bd. of Pub. Wks. has ordered City Engr. Randall to prepare plans for the elevation of the Nickel Plate tracks at Osage St.

Indianapolis, Ind.—The Indiana State Bd. of Agriculture has asked the Bd. of Pub. Wks. to make temporary repairs in 38th St., from Meridian St. to the fair grounds.

Michigan City, Ind.—The City Engr. has submitted to the Bd. of Public Wks. plans for a pavement in 7th St., from Willard Ave. to Huron St.; in 8th St., from Willard Ave. to the west line of the Michigan Central right of way; in Ninth St., from Willard Ave. to the west line of the Michigan Central right of way.

Rushville, Ind.—The Bd. of Cmrs. of Rush Co. will receive sealed proposals at the Cmrs. office, in the Court House of Rushville, until 2 p. m. Aug. 28, 1912, for the construction of a macadam road, as petitioned for by Melvin L. Moor et al.

The Bd. of Cmrs. of Rush Co., on the 28th day of Aug., 1912, at 2 p. m., at the office of the said board, in the Court House in the City of Rushville, will receive sealed proposals for improving a certain highway in Orange Twp. by grading, draining and paving the same with broken stone.

The Bd. of Cmrs. of the Co. of Rush

will receive sealed proposals at the Cmrs. office, in the Court House at Rushville, up until 2 p. m. Aug. 28, 1912, for the construction of a macadam road, as petitioned for by D. H. Dean et al. Jesse M. Stone, Aud. Rush Co.

Terre Haute, Ind.—With the adoption of the declaratory resolution for the improvement of North 14th St., from Wash Ave. to Locust St., the Bd. of Pub. Wks., has completed the preliminary work on the second of six streets which are included in the board's program of improvements.

Burlington, Ia.—Arrangements will be made at once for paving about 1,500 ft. on Prospect Hill. Address J. W. Topping.

Clear Lake, Ia.—By a unanimous vote of the City Council the resolution to pave was passed. This will include about ten blocks in all, and is the first paving to be done by the city.

Tracer, Ia.—A movement for paving a number of streets throughout the city is being considered. Address Pres. Business Mens' League.

Hutchinson, Kans.—Contracts will be let by the City Commission for the construction of eleven blocks of curbing and seven and one-half blocks guttering. Address Pres. Bd. of Loc. Imp.

Lawrence, Kans.—A resolution ordering the grading and paving of Massachusetts St., from Adams St. south two blocks was passed.

Wichita, Kans.—Bert C. Wells, City Engr., is preparing plans and specifications for the paving of South Wichita St., from William St. to Maple St. Asphaltic macadam is the material to be used.

Boston, Mass.—Commissioner Rourke has decided on the oak-keyed granite block system for the repaving of Beacon St., from Tremont to Bowdoin Sts.

Lapeer, Mich.—The City Council has voted to allow an appropriation for paving Genesee St. Address Pres. Bd. Loc. Imps.

St. Paul, Minn.—An order for paving Arcade St., from E. 7th St. to Maryland St., was favorably acted on by the Bd. of Pub. Wks. It is probable that creosote blocks will be used.

Springfield, Mo.—A resolution was passed declaring it necessary to improve the roadway of Campbell St. by paving the same with concrete paving, from the center line of Division St. to the south curb line of Commercial St.

Webb City, Mo.—The Webb City Council is planning authorizing an appropriation for paving several streets. Address City Clerk.

Lincoln, Neb.—The paving of the alley north of the City Hall with asphaltic concrete is being considered by the council.

Akron, O.—An ordinance has been passed determining to proceed with the improvement of Sibley Alley, from Bartest St. to Campbell St., by grading, curbing and paving.

Ashtabula, O.—The City Council is planning to expend \$42,000 paving many streets throughout the city. Address City Clerk.

Canton, O.—An ordinance has been passed to proceed with the improvement of Dueber Ave., from Navarre St. to the Wheeling & Lake Erie Railroad by grading and paving.

Cincinnati, O.—Sealed proposals will be received by the Hamilton Co. Cmrs. until Aug. 23, for improvement of Yonote Road, from Beaumont St. to the end of improvement north of Madisonville Road, in Columbia Twp. A. Reinhardt, Clerk.

An ordinance was passed determining to proceed with the improvement of Isabella St., from the north end of the present improvement to Markbreit Ave., by grading, paving the roadway with bituminous macadam and constructing the necessary drains and inlets.

An ordinance was passed determining to proceed with the improvement of McMakin St., from Jo Williams St. to Deloney St., by grading, setting granite curbs, paving the roadway with brick and constructing the necessary drains and inlets.

An ordinance was passed determining to proceed with the improvement of Gholson Ave., from Reading Road to Washington Ave., by paving the roadway with asphalt or Bitulithic, resetting old granite curbs and furnishing and

setting new granite curbs where necessary.

An ordinance was passed determining to proceed with the improvement of Stanton Ave., from Beecher Ave. to Melish Ave., by grading, setting stone curbs, paving the roadway with stone blocks and constructing the necessary drains and inlets.

An ordinance was passed determining to proceed with the improvement of East 8th Ave., from a point 126 ft. east of the east curb of Broadway to Eggleston Ave., by grading, setting granite curbing and paving the roadway with granite blocks.

A resolution was passed declaring it necessary to improve East 5th Ave., from Eggleston Ave., to Lock St., by paving the roadway with stone block pavement.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Comr. until Aug. 22, 1912, for paving and grading several streets. Jas. R. Marker is State Highway Comr.

Sealed proposals will be received at the office of the State Highway Comr. until Aug. 19 for grading and paving with concrete the Ghent Road, Pet. No. 409, State Highway E, in Copley and Bath Twp., Summit Co. J. R. Marker, Highway Comr.

An ordinance was passed determining to proceed with the improvement of Oregon Ave., from 3d Ave. to 3d Ave.

An ordinance was passed determining to proceed with the improvement of 20th St., from Oak St. to Bryden Road.

An ordinance was passed determining to proceed with the improvement of Cline St., from Parsons Ave. to east terminus.

An ordinance was passed to provide for the issue of bonds in anticipation of the collection of special assessments for the improvement of Capital St., from Front St. to Scioto St.

An ordinance was passed determining to proceed with the improvement of Mt. Vernon Ave., from Nelliston St. to Cleveland Ave.

An ordinance was passed determining to proceed with the improvement of Deshler Ave., from Parsons Ave. to east terminus.

An ordinance was passed to proceed with the issue of bonds in anticipation of the collection of special assessments for the improvement of Spring St., from 9th St. to Jefferson Ave.

An ordinance was passed determining to proceed with the improvement of Conklin St., from the alley west of Neil Ave. to Michigan Ave.

An ordinance was passed determining to proceed with the improvement of State St., from the alley east of Yale Ave. to Central Ave.

An ordinance was passed determining to proceed with the improvement of Sherman Ave., from Franklin Ave. to the alley north of Bryden Road.

An ordinance was passed determining to proceed with the improvement of the alley north of Mt. Vernon Ave., from Graham St. to Johnson St.

An ordinance was passed determining to proceed with the improvement of Martin Ave., from Town St. to Sullivan Ave.

Dayton, O.—An ordinance has been passed determining to proceed with the improvement of alley north of Cottage Grove Ave., from alley east of Salem Ave. to Bellevue Ave.

Geneva, O.—The Twp. Trustees are arranging for allowing an appropriation for constructing one mile of improved road. Address M. A. Austin, Trustees.

Marletta, O.—An ordinance was passed determining to proceed with the improvement of Cutler St., from 5th St. to 6th St. by paving.

An ordinance was passed determining to proceed with the improvement of Wooster St., from 7th St. to 8th St. by paving.

An ordinance was passed determining to proceed with the improvement of Tupper St., from 5th St. to 7th St. by paving.

Newark, O.—Sealed proposals will be received until Aug. 31 for the purchase of bonds in the sum of \$10,000 for the purpose of improving by grading and paving a part of the road known as the Newark and Zanesville Road. C. L. Riley, Looking Co. And

An ordinance was passed determining to proceed with the improvement of Cedar St., from cemetery office to corporation line by paving and curbing the roadway thereof.

An ordinance was passed determining

to proceed with the improvement of Union St., from Pine St. to south corporation line by paving and curbing the roadway thereof.

An ordinance was passed determining to proceed with the improvement of Granville St., from 7th St. to 16th St., by paving and curbing the roadway thereof.

Richwood, O.—An ordinance was passed to levy special assessments for the improvement of Blagrove St., from the east corporation line to the west line of Fulton St., by paving the same with vitrified brick.

An ordinance was passed to levy special assessments for the improvement of Ottawa St., from east corporation line to west line of N. Y. P. & O R. R. Co.'s right of way by paving the same with vitrified brick.

St. Bernard, O.—Sealed proposals will be received at the office of the Dir. of Pub. Serv., City Hall, until noon, Aug. 19, 1912, for the improvement of Kemper Ave., from Church St. to Franklin Ave., by constructing artificial stone sidewalks 4 ft. in width on both side of said Kemper Ave., between said points.

Sealed proposals will be received at the office of the Dir. of Pub. Serv., City Hall, until noon, Aug. 19, 1912, for the improvement of both sides of Sullivan Ave., between Washington Ave. and Jackson Ave., by constructing artificial stone sidewalks 4 ft. in width, and all the necessary intersections. Wm. J. Volter, Clerk.

Sealed proposals will be received at the office of the Dir. of Pub. Serv., City Hall, until noon, Aug. 19, 1912, for the improvement of Church St., from Sullivan to Kemper Aves., by constructing artificial stone sidewalks 4 ft. in width on both sides of said Church St., between said points.

Sealed proposals will be received at the office of the Dir. of Pub. Serv., City Hall, until noon, Aug. 19, 1912, for the improvement of Langley Ave., from Mitchell Ave. to Delmar Ave., by constructing artificial stone sidewalks 4 ft. in width on both sides of said Langley Ave., between said points.

Steubenville, O.—An ordinance was passed to levy special assessments for the purpose of paying for the improvement of the alley between George N. Henry's sub-division and The Pleasant Heights Improvement Co.'s addition, by paving.

An ordinance was passed to levy special assessments for the purpose of paying for the improvements of Carnegie St., from Ridge Ave. to Pennsylvania Ave., by the construction of a fire brick pavement, with the necessary curbs, etc.

An ordinance was passed to levy special assessments for the purpose of paying for the improvement of Clair Ave. and the streets in George B. Henry's addition by paving.

A resolution was passed to establish a grade and improve Superior St., from 7th St. to Highland Ave., by the construction of a fire brick pavement.

An ordinance was passed to levy special assessments for the purpose of paying for the improvement of Slack St., from 3d St. to High St., by the construction of a vitrified fire brick pavement, and Wells St., from Bates St. to Slack St., and Slack St., from Wells St. to 3d St., by the construction of pavement of Hillside paving block.

An ordinance was passed to levy special assessments for the purpose of paying for the improvement of Pine St., from Park St. to George N. Henry's sub-division, by paving and the construction of a sewer for storm and sanitary purposes.

An assessment has been passed to levy special assessments for the purpose of paving for the improvement of Sumner Alley, from 7th St. to Marsh Alley, by paving.

Toledo, O.—Sealed proposals will be received by the Co. Cmrs. of Lucas Co. until Aug. 19 for the improvement by grading, draining and macadamizing of a county road, known as Sylvania Twp. Stone and gravel road, No. 23, Chas. J. Sanzenbacher, Co. Aud.

A resolution declaring it necessary to improve the alley between Wakeman St. and North 12th St., from Woodruff Ave. to Beacon St., by grading and paving, has been passed.

Sealed proposals will be received by the Bd. of Co. Cmrs. for doing certain road work, according to plans and specifications.

Youngstown, O.—An ordinance has been passed levying special assessments to pay the cost and expense of grading,

setting curb and paving Liberty St., from State St. west to the Mahoning River.

Marcus Hook, Pa.—Bids will be received Aug. 19 for the paving of McClenahan Terrace. Address C. Howard Casey, Chmn. Com.

Pittsburgh, Pa.—The Council has passed an ordinance for the elimination of the grade crossings at Homewood and Brushton Aves. by the construction of underground crossings and for the possible construction of an overhead crossing at Lang Ave.

El Paso, Tex.—The Co. Cmrs. of El Paso Co. have called an election for Aug. 27 to vote on the issuance of good roads bonds in the amount of \$150,000 for the purpose of building a highway from Fabens to Fort Quitman, located in the eastern part of the county.

Houston, Tex.—In a petition headed by James H. Adair, President of the Houston Cotton Exchange, 40 cotton firms have petitioned the Co. Cmrs. for immediate continuation of the pavement of the county road on the north side of Buffalo Bayou from the Turning Basin to Clinton, giving free access over a paved thoroughfare to the cotton warehouses at Clinton.

Port Arthur, Tex.—Sealed proposals will be received by the City Com. of the City of Port Arthur, up to 10 a. m. Aug. 21, 1912, in the office of the Com., for paving Houston Ave., from 7th St. to Proctor St., and Proctor St., from Houston Ave. to Shreveport Ave.

Taylor, Tex.—The city will ask for bids soon for paving ten blocks in the business section at a cost of about \$80,000.

Wheeling, W. Va.—As a result of the good roads mass meeting held in the court house hall at St. Clairsville recently the Co. Cmrs. of Ohio Co. have declared they would pave the National Road, from Bridgeport west to the foot of the big hill, a distance of four miles.

At a recent meeting of the Bd. of Cmrs. it was finally decided to pave the Park View Lane, and work will be started immediately.

Beaver Dam, Wis.—Resolutions were adopted by which the Bd. of Pub. Wks. was authorized to employ an engineer to prepare plans, profile and specifications for paving on six separate streets in the city.

Green Bay, Wis.—Bids will be received up to 3 p. m. Aug. 20, 1912, at the City Council Chamber of the City Hall for the graveling of the Ridge Road, from 9th St. south to the city limits.

Superior, Wis.—At a special session of the City Cmrs. the Cmrs. voted to have the Bd. of Pub. Wks. receive bids on the improvement of the south alley running east and west, between Winter and Broadway Sts.

Bids Received and Contracts Awarded

Alhambra, Cal.—The following bids were received by the Trustees of Alhambra for the improvement of Marengo Ave.: W. Dontanville, Pasadena, 18c. per sq. ft. for gutter, 9½c. per sq. ft. for sidewalk, 25c. per lin. ft. for curb, \$3,358 for ornamental lighting. Michelson, of South Pasadena, bid 12c. for gutter, 8c. for sidewalk, 22c. for curb, \$3,066 for ornamental lighting. W. Dontanville was the only bidder for the improvement of Ramona Blvd., at 47c. per lin. ft. for grading, 3c. per sq. ft. for oiling, 12c. per sq. ft. for cement gutter, 22c. per lin. ft. for cement curb.

Long Beach, Cal.—Charles Stanbury, H. W. Hellman building, Los Angeles, was low bidder at \$27,500 for improving Pine Ave., from Ocean Ave. to 6th St.

Los Angeles, Cal.—The following bids were received for improving Occidental Blvd., from 1st to 6th Sts.: Barber Asphalt Paving Co., (a) 17½c. for asphalt paving; (b) 40c. for cement curb; (c) 14½c. for cement gutter; (d) 41½c. for granite block gutter; (e) \$135 each for culverts; (f) \$2,653.50 for storm drains. Fairchild-Gilmore-Wilton Co. (a) 17c.; (b) 33c.; (c) 16c.; (d) 45c.; (e) \$100; (f) \$2,200.

For improving Shatto Pl., between 5th and Wilshire Blvd.: Barber Asphalt Paving Co. bid 16.9c. for paving and 40c. for cement curb. The Fairchild-Gilmore-Wilton Co. bid 16.7c. and 30c., and 15c. for cement gutter.

George E. Spain was the low bidder for improving De Longpre Ave., from Western Ave. to Wilton Pl., at \$1.45 for grading and graveling; 55c. for granite block gutter; 16c. for cement gutter; 33c. for vitrified block gutter; 11.6c. for sidewalk.

For improving 1st St. from Evergreen Ave. to the east city limits, the Barber Asphalt Paving Co. bid (a) 17.2c. for paving; (b) 35c. for cement curb; (c) 26c. for vitrified brick gutter; (d) 11c. for sidewalk; (e) \$1,883 and \$428 for storm drains. Fairchild-Gilmore-Wilton Co., (a) 18.5c.; (b) 32c.; (c) 32c.; (d) 12c.; (e) \$1,675 and \$420; (f) 40c. for granite block gutter.

For improving Canal St., Wilmington, B. C. Nichols bid (a) 18.7c. for paving; (b) 38c. for cement curb; (c) 60c. for granite block gutter; (d) 13c. for sidewalk; (e) \$8,500 for storm drains. Fairchild-Gilmore-Wilton Co., (a) 20c.; (b) 30c.; (c) 45c.; (d) 11c.; (e) \$11,960.

D. D. Chapman, 216 North Johnston St., was awarded contract at \$7,848.42 for improving Savannah St., between Brooklyn Ave. and 1st St. The work consists of 1200 lin. ft. grading and graveling, 2347.73 lin. ft. cement curb, 6242.13 sq. ft. cement gutter, 1682.71 sq. ft. granite gutter, 11,233.59 sq. ft. cement sidewalk.

Pasadena, Cal.—Cox & Mathews, of Pasadena, have been awarded the contract for the construction of the Rubio Canyon storm drain, on their bid of \$109,933.45. The drain will run from a settling basin 700 ft. north of New York Ave. down Sierra Bonita Ave. to San Pasqual St. The ditch will be covered with corrugated iron for a length of 10,000 ft. and with reinforced concrete for 3,000 ft. Engr. Lewis A. Bartlett drew the plans.

The City Council awarded the contract for improving Lincoln Ave. to J. C. Kinsman at \$15,744.60.

San Diego, Cal.—George H. Oswald was low bidder at \$292,983.08 for the construction of 20 miles of grading, 40 miles of sidewalks, curbs and gutters in Normal Heights. Knight & Hyde bid \$349,749.79. The detailed bids are: Geo. H. Oswald, excavation, \$73,556; embankment, \$445; surfacing, \$63,000.08; sidewalks, \$86,690; curb, \$51,298; cross walks, \$2,313.50; gutters, \$255.50; catch basins, \$50; approaches, \$1,930; entrance, \$415; 8-in. pipe, \$7,950; 12-in. pipe, \$30. Knight & Hyde, excavation, \$111,122.10; sidewalks, \$5,693.50; embankment, \$3,115; surfacing, \$54,222.20; curbs, \$1,850.80; gutters, \$525.60; catch basins, \$10; approaches, \$1,440; entrances, \$1,037.50; 8-in. pipe, \$10,600; 12-in. pipe, \$37.50.

Ford & Stout, Bradbury building, Los Angeles, have been awarded the contract for the paving of India St. The contract price is \$95,589.95.

Tropico, Cal.—Fred R. Sinclair, Glendale, has the contract for the street work, grading, paving, curbing and sidewalking of the new 80-acre subdivision in the Richardson ranch, just inside the Los Angeles city limits.

Monmouth, Ill.—The Bd. of Loc. Imps. has awarded a contract for paving W. Boston Ave. district, comprising 18 blocks, to the Burlington Constr. Co., of Burlington.

Paris, Ill.—A contract for the construction of 2 miles of brick road has been awarded to Alan J. Parish.

Rockford, Ill.—Oscar A. Johnson was awarded the contract to build all walks ordered by the city during 1912. The price is to be 9c. a sq. ft. for cement work and 50c. a cu. ft. for fill.

Winnetka, Ill.—A contract for paving in the village has been awarded to McCugo & Pullock, of Waukegan, for \$20,000.

Danville, Ind.—The Town Bd. has awarded the contract for constructing cement sidewalks on the east end of Main St. to Ira Martin, at 50c. per lin. ft.

Great Falls, Mont.—Contracts have been let to the Warren Construction Co., of Portland, Ore., for laying hard surface streets throughout Bayocean, to cost \$200,000.

BRIDGES

Bids Asked and Prospective Work

Ashdown, Ark.—Sealed bids will be received by N. A. George and A. L. Tribble, Co. Judges of Little Rock Co., until Aug. 30, for the construction of a bridge over Little River, according to plans and specifications on file at the office of City Engr. Frank L. Blaisdell, Southern Trust Bldg., Little Rock, Ark.

Los Angeles, Cal.—Bids will be received by the Bd. of Spvrs. up to 2 p. m. Aug. 26, 1912, for the construction of a combination truss bridge and approaches across the Old San Gabriel River, on the Downey and Florence Road.

Ventura, Cal.—The City Engr. is preparing plans and specifications for a bridge to be 800 ft. or more in length, to be constructed across the Ventura River. A similar bridge will be constructed in the western approach, for which bids will be called at the same time.

Denver, Colo.—Thirteen plans for the construction of the West Colfax viaduct have been submitted to the Bd. of Pub. Wks. by Engr. H. S. Crocker.

Meriden, Conn.—The Bd. of Pub. Wks. voted to solicit bids on the construction of a flat slabbed highway bridge of reinforced concrete to be erected at East Canal, Merimere.

Belmont, Ill.—The Milford Twp. Cmrs. are to make necessary arrangements for the erection of a new \$10,000 bridge across Sugar Creek.

Chicago, Ill.—Sealed proposals will be received by the City of Chicago until Aug. 19, 1912, at the office of the Cmr. of Pub. Wks., 406 City Hall, for furnishing, fabricating and delivery to the city of Chicago steel for three plate girder spans at 40th Ave. and North Central Park Ave. and North 48th Ave. intersection, estimated weight 225 tons, according to plans and specifications on file at the office of the Dept. of the Bd. of Pub. Wks., 406 City Hall. L. E. McGann, Cmr. Pub. Wks.

Harvey, Ill.—Bids will be received by the Cmrs. of Calumet Drainage district No. 1, of the towns of Thornton and Bremen, in Cook Co., until Aug. 21, 1912, for the construction of concrete bridge abutments on 14th St., and drainage canal at Harvey, Ill. A. E. Schultz, E. T. Osgood, G. E. Sidle, Cmrs.

Peoria, Ill.—The Bridge St. viaduct over the P. & P. U and C. R. I. & P. Railroad will be begun about Oct. 1, 1912, and completed May 1, 1913, under a tentative agreement reached by President H. N. Pinkney, and the attorneys representing the latter. The viaduct is estimated to cost \$50,000.

Franklin, Ind.—A bridge on Jackson St. is contemplated.

Vincennes, Ind.—A new bridge on 15th St. near the Murphy Distilling Co.'s plant, was ordered by the Bd. of Co. Cmrs. of Knox Co.

Louisville, Ky.—City Engr. C. W. Appleby, of New Albany, has completed plans for the construction of the bridge over Falling Run, at West 2d St.

Carthage, Mo.—The Jasper Co. Court has instructed Co. Surv. Kohlman to prepare plans for a new bridge over Spring River, at this city, to replace the old structure, that has been in use for a long time. Two sets of plans will be prepared, one for a pony truss and the other for a concrete arch. Address Co. Surv., Carthage, Mo.

Trenton, N. J.—The Mercer Co. Engr. is preparing plans for a \$7,000 bridge at Windsor Pond. Address Co. Engr. F. J. Eppler.

Las Vegas, N. M.—Petitions are being circulated asking for the erection of three new bridges at Villanueva, Azul and Pecos, San Miguel Co. Address Geo. R. Morrison, Co. Engr.

Lockport, N. Y.—The State Canal Bd. of Albany has adopted plans of State Engr. Bensel providing for an extension of the bridge which crosses the Barge Canal at the foot of Main St., for an additional expenditure of \$75,000.

Middleport, N. Y.—The canal authorities have decided that the proposed lift bridge over the Erie Canal at Main St. shall be installed this fall.

Winston Salem, N. C.—The first step toward the construction of a steel bridge across the Yadkin River, near Clemmons, linking Forsyth and Davie Cos., was taken by the Bd. of Cmrs. of Forsyth Co.

Athens, O.—Comr. Brammer and Engr. Creamer decided to put in a span at the Ed Bean Bridge, near Guysville. The new span will be 15 ft. higher than the old one, which is 33 ft. in length, and which will be used at another point.

Chillicothe, O.—Sealed proposals will be received at the office of the Ross Co. Auditor until Aug. 19, 1912, for the necessary labor and material necessary for erecting Bull Creek bridge sub-structure, in Colerain Twp. Robt. D. Alexander is Aud.

Cincinnati, O.—It is reported that during the next five months the City Bridge Engr. will present to the Council a request for a \$200,000 bond issue to pay for the replacing of old small wooden

bridges in the city with concrete structures.

Cleveland, O.—Sealed proposals will be received by the Cuyahoga Co. Cmrs. until Aug. 21, for the construction of bridge work per report No. 2960, terra cotta balustrade, for concrete bridge over Nine-Mile Creek, Lake Shore Blvd., E. Cleveland Twp. J. F. Goldenbogen, Clerk.

Sealed proposals will be received by the Clerk of Cuyahoga Co. until Aug. 24 for erecting in place the steel arch and shoes for the 591-ft. span of the Detroit-Superior bridge over the Cuyahoga River.

Sealed bids will be received at the office of the Bd. of Cmrs. of Cuyahoga Co. until 11 a. m., Sept. 5, 1912, for the construction of bridge work per report 2906, railing, wall, grading, etc., intersection of Irish and Nobottom Roads, Middleburg Twp.

Columbus, O.—Sealed proposals will be received at the office of the Co. Cmrs. until Aug. 30, 1912, for the complete reconstruction of the substructure of the Ashton bridge, south of Reynoldsburg, according to plans and specifications on file at the office of the Co. Aud. F. M. Sayre, Co. Aud.

Findlay, O.—Sealed proposals will be received by the Co. Cmrs. of Hancock up to Aug. 23 for the construction and completion of both the substructure and superstructure of a steel bridge over Blanchard River, located on the O. P. Shaw Road. Lewis Brickman, J. Roller, J. C. Greer, Cmrs.

Youngstown, O.—The Himrod Ave. property owners are discussing plans for the elimination of the dangerous Himrod Ave. crossing. A viaduct is expected to be constructed. Address City Engr. Frank Lillie.

Chattanooga, Tenn.—Sealed proposals will be received until Aug. 20 for the construction of two concrete bridges on Dry Valley Road. G. Russell Brown, Chmn.

Chatham, Va.—Bids will be received up to Sept. 2 for the construction of a bridge across Elkhorn Creek, on road leading from Oliver's store to Riceville, also one across Cane Creek, on road leading from Danville to Milton, N. C.

Bids Received and Contracts Awarded.

Decatur, Ill.—From the seven bids submitted the Highway Cmrs. selected the Decatur Bridge Co.'s bid of \$36,487, as the most satisfactory. They accordingly let to that concern the contract for the new county bridge at the foot of South Franklin St.

Farmer City, Ill.—The contract for the new bridge across Salt Creek was let to Mr. Quinlan of Chicago for \$3,035. The bridge is at the southeast part of the city, known as the red bridge.

Durham, N. C.—The Bd. of Co. Cmrs. of Durham Co. has made a contract with the Carolina Constr. Co. for the construction of a concrete bridge over Ellerbee Creek, to cost \$5,000.

BONDS

Carpinteria, Cal.—Bonds in the sum of \$85,000 have been voted for road purposes.

Santa Ana, Cal.—Orange Co. indorsed at the special election the \$100,000 bond issue for county bridges.

Sanford, Fla.—In the bond election held in this city recently for the issue of \$200,000 for good roads the issue was carried by an overwhelming majority.

Milford, Ill.—An ordinance has been passed by the Village Bd. of Milford to submit to the voters a proposition to issue bonds to the amount of \$3,000 for paving purposes.

Momence, Ill.—An election will be held Aug. 20 to vote on the issuance of \$30,000 of bonds for stone roads.

Baltimore, Md.—Sealed bids will be received on Sept. 3 for the purchase of \$300,000 worth of 4½% Baltimore Co. road bonds. Address E. Stanton Bosley, Chief Clerk.

Minneapolis, Minn.—The Council has adopted a resolution recommending an issue of park bonds to the amount of \$150,000. Address City Comptroller.

Kosciusko, Miss.—District No. 1, of Attala Co., has voted to issue \$50,000 in bonds for the purpose of improving the public roads of that district.

Poplar Bluff, Mo.—Eighty-three thou-

sand dollars in bonds have been voted for road improvements. Address City Clerk.

Astabula, O.—An ordinance was passed to issue bonds in the sum of \$1,800 for the purpose of improving Dakota St., from Ohio Ave. to Lake St., by grading and draining the same.

Canal Dover, O.—At a special meeting of the Council an ordinance was passed authorizing the sale of \$12,000 in bonds for paving North Factory St. Address City Clerk.

Dayton, O.—The citizens have voted to issue \$20,000 paving bonds. Address City Aud.

Sealed proposals will be received until Aug. 29 for the sale of bonds in the amount of \$23,000 for the improvement of North Main St., from Norman Ave. to the corporation line by grading the sidewalks and paving the roadway.

Sealed proposals will be received until Aug. 29 for the sale of bonds in the amount of \$34,000 for the paving of Burkhardt Ave., from Gillespie St. to Overlook Ave. Geo. W. Bish, Aud.

Delta, O.—Bids will be received Sept. 2 for the purchase of \$13,750 4½% street improvement bonds. C. W. Hatton, Vill. Clerk.

East Youngstown, O.—Bids will be received Aug. 26 for the purchase of about \$38,000 street improvement bonds. Address R. J. Carney, Vill. Clerk.

Geneva, O.—Petitions calling for a referendum election on the question of paving East Main St. has been filed with W. E. Morgan, Vill. Clerk.

Hamilton, O.—Bids will be received Aug. 26 for the purchase of \$25,000 storm sewer bonds. Address H. A. Grimmer, City Aud.

Mt. Gilead, O.—Sealed bids will be received Aug. 30 for the purchase of 4½% county road bonds, amounting to \$30,000. Address Clifton Sipe, Co. Aud., Morrow Co.

Newark, O.—Bids will be received Aug. 31 for the purchase of \$10,000 Newark and Zanesville Road bonds and \$10,000 Lineville extension pipe bonds. Interest 4½%. C. L. Riley, Co. Aud.

Richwood, O.—An ordinance was passed

to levy special assessments for the improvement of Clinton St., from Blagrove St. to Wood St., by paving the same with vitrified brick.

Springfield, O.—An ordinance was recently passed to provide for the issue of bonds in the sum of \$6,189.34 for the purpose of providing funds to pay the city's portion of the cost and expense of street improvements.

Bids will be received Aug. 27 for the purchase of \$20,000 4% boulevard bonds. Address Frank X. Lothschuetz, City Aud.

Toledo, O.—An ordinance has been passed to provide for the issue of bonds to pay for the improvement of Collins St. No. 1 by paving from Collingswood Ave. to Detroit Ave.

Bids will be received Aug. 27 for the sale of \$3,000 road improvement bonds. Address Chas. J. Sanzenbacher, Aud.

Warren, O.—The Council has authorized an issue of road improvement bonds amounting to \$20,000. Address City Clk.

West Mansfield, O.—Sealed bids will be received at the office of C. D. Atkinson, Clerk, until Aug. 30, for the purchase of special assessment street improvement bonds amounting to \$23,000 for the paving of N. Main and State Sts.

Youngstown, O.—Bids will be received Aug. 19 for the purchase of about \$40,000 street improvement bonds. Address Dan J. Jones, City Aud.

Farrell, Pa.—Fifty thousand dollars in bonds have been voted for street improvements. Address City Clerk.

Abilene, Tex.—\$30,000 in bonds have been voted for street improvements. Address Mayor.

Austin, Tex.—The Attorney General's Department has approved a \$25,000 issue of Waxahachie street improvement bonds.

El Paso, Tex.—The El Paso Co. Comrs. have called an election for August 27 to vote on the issuance of good roads bonds to the amount of \$150,000 for the purpose of building a highway from Fabens to Fort Quitman, located in the eastern part of this county.

Meridian, Tex.—Valley Mills precinct of

Bosque county has disposed of \$40,000 in good roads bonds, and construction work on the highways will commence at once.

Pulaski, Va.—The question of issuing \$100,000 Pulaski Co. road bonds will be submitted to a vote of the people. Address Co. Clerk.

MISCELLANEOUS

Glendale, Cal.—The City Trustees are preparing to purchase road machinery for keeping the streets oiled and in repair. Ed. M. Lynch, City Hall, is City Eng.

The Commonwealth of Massachusetts. MASSACHUSETTS HIGHWAY COM- MISSION.

NOTICE TO CONTRACTORS.

Sealed proposals for building a section of highway about twelve (12) miles in length, including three (3) concrete arch bridges, in the towns of Florida, Savoy and Charlemont, will be received by the Massachusetts Highway Commission at its office, 15 Ashburton Place, Boston, Mass., until 12 M. on Tuesday, August 27, 1912, at which time and place they will be publicly opened and read.

Bids must be made upon blanks to be furnished by the Commission.

A pamphlet containing the necessary information and blanks will be furnished on application, upon receipt of a deposit of \$2.00, said amount to be returned if the person taking the pamphlet makes a bid for the work on the form provided in said pamphlet, or returns the pamphlet at or before the time of the opening of the bids.

Plans and profiles may be seen at the above office.

No bids will be received unless accompanied by a certified check for the sum of \$1,000, payable to the Commonwealth of Massachusetts.

The Commission reserves the right to reject any and all bids.

WILLIAM D. SOHIER,
FRANK D. KEMP,
JAMES W. SYNAN,
Massachusetts Highway Commission.
Boston, August 13, 1912.

History of Bridge Engineering

A semi-technical review of the progress of bridge building from earliest periods to the present time, including studies of Egyptian, Babylonian, Persian, Roman, Mediaeval and Renaissance bridges and descriptions and uses of modern Stone, Pontoon, Aqueduct, Wooden, Iron, Tubular and Plate Girder, Suspension, Cantilever Bridges, Wrought Iron and Steel Arches, Trestles and Viaducts and Solid Concrete and Reinforced Concrete Bridges.

BY

HENRY GRATTAN TYRRELL, C. E.

Bridge and Structural Engineer

Author of "Concrete Bridges and Culverts," etc.

6 by 9 inches, 480 Pages

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GOOD ROADS

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Number
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Road Work In Arkansas

Little Rock, Ark., is gradually becoming the center of a system of improved highways connecting it with all the principal towns of neighboring counties. In the last few years many new roads have been constructed, others are now in process of building and plans are being formulated for a still more extensive system of highways to be built in the near future.

One of the important improvements of this kind now under way is intended to complete the through route between Pine Bluff and Little Rock, and when finished will bring Pine Bluff and intermediate towns in close touch with the capital.

On the south side of the Arkansas River there was completed four years ago, a pike, known as the Alexander Pike, 12 miles east of Argenta. For the extension of this highway, road district No. 3 was organized, extending from the terminus of the Alexander Pike, 14 miles to a point $8\frac{1}{2}$ miles south of Scott station. This road is now under construction, about 11 miles having already been covered with coarse rock. The entire length of the road has been graded, tiled and bridged with concrete structures.

A district in which the third section of this road is to be built was organized about three months ago, and will extend south, a distance of $6\frac{1}{2}$ miles to the Jefferson County line. About two-thirds of this road has been graded and the remainder will be finished within a month or six weeks. The distance from the north approach to the free bridge in Argenta to the Jefferson County line is $32\frac{1}{2}$ miles. The Jefferson County citizens propose to extend this road in that county to Pine Bluff, a distance of 27 miles further. This section of the road is now being graded under the direction of Judge C. M. Philpot, County Judge of Jefferson County.

In Lonoke County a road is being graded for a distance of eight miles west from England. The farmers and business men of England and vicinity are contributing labor for the construction of this road. It is to be extended later to Lonoke and from Lonoke west to a point near the terminus of the Alexander road, and will make a complete circuit of 54 miles of pike road.

Another road which is being contemplated is a pike on the south side of the Arkansas River, from Little Rock to Pine Bluff. This road will take in the old Pine Bluff highway from Little Rock, a distance of 46 miles between the court houses of Jefferson and Pulaski counties. Nine miles of this road out of Little Rock have been completed and when it is finished the highway will pass through Sweet Home, Wrightsville, Woodson, Farrell, Redfield, Jefferson, Springer and thence to Pine Bluff. About 16 miles of the Jefferson County end of this road have already been graded to a point 7 miles south of the Parkin township line in Saline County. In order to complete the road from Pine Bluff to Little Rock, a section will have to be built through Saline County, which can not be done under the road district system, as Saline County is not included in the legislative act of 1909, which authorizes the creation of road improvement districts. The counties in which the law permits such or-

ganizations are Jefferson, Pulaski, Faulkner, Woodruff, Garland and Lincoln.

In order to build this Saline County gap in the road it is proposed to change the county lines so that Perkins township, now in Saline County will be annexed to Pulaski County, which, of course, can only be done by a special act of the Legislature, which will meet in Jan. 1913. It is assured that the passage of such an act will be asked. In case the bill becomes a law a road district will be organized in Perkins township by which provision will be made for the construction of that part of the road. Should the act fail of passage, the Legislature will be asked to pass a law creating a special road district in the township.

Other highway plans are being promoted in Pulaski County, among which is a proposed road district to be created in Union township. A petition asking for the establishment of such a district has been presented to the county judge and he has it under advisement. It is proposed to build in this district a road about eight miles long. It is stated that the property owners for miles adjacent to the proposed pike are in favor of the improvement.

Grade Crossing Changes In Amherst, Mass.

Two estimates of the cost of eliminating the grade crossings at Main, High and Whitney Sts. in Amherst, Mass., have been submitted by H. W. Hayes, engineer of grade crossings for the Massachusetts Railroad Commission.

The first plan, which calls for the relocation of the railroad tracks to the east, shows a total estimated expenditure of \$216,000, itemized as follows: Construction, including \$67,000 for filling, \$13,176 for concrete masonry, \$13,600 for bridges and \$7,500 for new station, \$124,697; Whitney St. extension, \$1,143, engineering and contingencies, \$12,590, land damages, \$79,500. A credit of \$1,930 is allowed for track room.

In the second plan, which calls for the tunnelling of Main St. the estimate is \$94,460. Items are as follows: Track work, \$14,474; grading, \$14,600; street work, \$10,434, making a total for construction of \$39,508; engineering and contingencies, \$3,952; land damages, \$51,000.

Association To Care For Roads

Eight miles of streets on four main roads leading from Minneapolis, Minn., to the surrounding counties will be maintained at the expense of the highways committee of the Civic and Commerce Association, in accordance with an action recently taken by that organization.

A number of road drags will be used under the direction of H. W. Thompson, a road expert, employed by the committee, and a demonstration of effective dragging as one of the best methods of maintenance will be made.

The following roads will be maintained at the committee's expense: Stockyards roads from Broadway to the city limits N. E., $1\frac{1}{2}$ miles; Portland Ave. from Lake St. to Minnehaha Boulevard $2\frac{1}{2}$ miles, and another street $2\frac{1}{2}$ miles long to be selected by the North Side Commercial Club of Minneapolis.

Montgomery Good Roads Association

The recent organization of the Monterey Good Roads Association was the first step in a campaign which has for its purpose the construction of a highway to run between the crossing of the Rio Grande at Laredo, Texas, and the City of Mexico, a distance of approximately 900 miles. It is stated that this movement not only has the indorsement of President Francisco, I. Madero, Jr., of Mexico, but there is a probability that the Mexican federal government will lend material financial aid to the construction of the proposed highway.

Engineers who have gone over the route have given opinions to the effect that no serious construction difficulty will be encountered in the accomplishment of the project. There are existing already several sections of old government roads that can be used as links in the road, it is claimed. The different states and towns through which the highway will pass are said to favor the new road and are giving assurances of aid.

The Monterey Good Roads Association is particularly interested in the construction of the link of the proposed road between Monterey and Laredo, as it will give Monterey a good road outlet to the United States by that route.

Plans are already well advanced for the construction of a highway between San Antonio and Laredo, the work being promoted by the San Antonio-Laredo Highway Association, which held a meeting at Laredo August 24 for the purpose of receiving reports from the local good roads associations in the different counties through which the proposed highway will pass. D. E. Colp, of San Antonio, is president of the San Antonio-Laredo Highway Association.

The distance from Monterey to Laredo is approximately 200 miles, and it is stated that this division of the proposed highway can be constructed at a comparatively small cost. Preliminary plans have already progressed to a point where it is practically assured that the work of construction will be started within the next few weeks and that the first 200 miles of the road will be finished by the first of the year. From San Antonio to Laredo the distance is now 175 miles along the route of the proposed highway. This will make the entire distance between San Antonio and Monterey approximately 375 miles.

San Antonio during the winter time is a favorite resort for tourists, many of whom bring their automobiles with them. With a modern highway running from San Antonio through Mexico to the capital of the republic it is thought that the tour will be a popular one with visitors to San Antonio.

Besides the automobile feature of the proposed international good road, the agricultural and business interests along the route are expected to be greatly benefited, and it is from this standpoint largely that the Mexican end of the highway is being promoted.

Contemplated Extension of Good Road System In Alberta

Hon. C. R. Mitchell, Minister of Public Works of the Province of Alberta, Canada, has outlined a program of road construction throughout the province upon which work will undoubtedly be started within a short time. The plans include the building of a main trunk road from Athabasca Landing, through Edmonton and Calgary, to Macleod, with lines branching east and west of the main highway from Medicine Hat to the towns of the Crow's Nest Pass country.

Mr. Mitchell recently made a tour of inspection throughout the southern part of the province, and it is stated that the program which is outlined will be rushed to completion as rapidly as weather conditions will permit. The expense is to be paid out of the \$1,000,000 appropriation set aside

by the Provincial Government for work during the present year.

In the construction of the main trunk highways advantage is being taken of existing roads which lie along the proposed route, large sections of new road are being constructed, and wherever traffic will warrant the building of entirely new branch lines as feeders to the main system it will be done. In addition to this, corresponding work is being carried on in other sections of the province which are provided with good railroad service, in order to facilitate traffic to the various shipping points.

Mr. Mitchell's itinerary included an automobile trip through Calgary to Macleod along the route of the proposed new road and through Macleod into the Crow's Nest Pass country, crossing the Frank slide and continuing as far as the eastern boundary of the province, stopping at all towns en route. Subsequently he inspected the road from Lethbridge to Medicine Hat. He was accompanied by John Stocks, Deputy Minister of Public Works, and Malcolm Calder, Inspector of Public Works at Calgary. During his trip he located sites for new traffic bridges at Okotoks and High River, along the line of the proposed new trunk road.

Changes in the City Engineer's Department of Atlantic City

John W. Hackney, former City Engineer of Atlantic City, has again been appointed to that office, and has been made the head of the engineering and survey department at a salary of \$3,600 per year. Frank Mount, who had previously been appointed City Engineer at \$2,000 a year and declined to accept at that salary, was made assistant to Mr. Hackney. These appointments are what is generally conceded a satisfactory ending of the trouble which the engineering department of Atlantic City has been subjected to for some time.

Former City Engineer E. D. Rightmire was convicted of irregularities in his dealings with road contracts during the latter part of 1911, and was succeeded by Mr. Mount at a salary of \$4,000 a year.

The readjustment of the department makes Mr. Hackney Assistant Director of the Department of Public Works, while he is nominally known as City Engineer. He is considered to be qualified by long experience in municipal work to assume the various matters under the care of the commissioners, and will act as the executive under the director as well as adviser in all matters requiring technical knowledge in municipal engineering.

The Convention of the American Association of Park Superintendents

About 150 delegates from various parts of the United States and Canada attended the fourteenth annual convention of the American Association of Park Superintendents, held in Boston August 12, 13 and 14.

The program of the convention included business meetings, addresses by city officials and park authorities, stereopticon lectures and the reading of papers, inspecting Boston park systems and enjoying recreation tours.

The headquarters of the convention were at the Copley Square Hotel and the business meetings were held in Horticultural Hall. The general business meeting of the convention was held on August 13, at which it was decided to hold the next annual convention at Denver, Colo. The following officers were elected: Honorary President, for life, Charles E. Keith, Bridgeport, Conn.; President, James B. Shea, Boston, Mass.; Secretary, J. J. Levison, Brooklyn, N. Y.; Vice-Presidents: Frederick Steinhauer, Denver, Colo.; H. S. Richards, Chicago, Ill.; Alexander Stuart, Ottawa, Canada; A. V. Parker, Worcester, Mass.; C. G. Carpenter, Milwaukee, Wis., and F. A. Reinsch, Topeka, Kan.

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AUGUST 24, 1912.

Road Plans in Adams County, Miss.

The Board of Supervisors of Adams County, Miss., has decided upon an issue of \$150,000 in bonds, the proceeds of which will be used in the construction of county roads. The bonds run 40 years and probably will be series bonds of 10, 20, 30 and 40 years bearing 5 per cent. interest.

It is the purpose of the supervisors to expend \$2,000 per mile if it is found that this will assure durable roads, and if it will not, the amount per mile will be increased.

Under the present contract system Adams County is paying \$17,000 per year for keeping its roads in condition. The interest on \$150,000 at 5 per cent. will amount to only \$7,500. Taking the same amount each year for road maintenance the county can pay the \$7,500 per year interest, \$7,000 for the maintenance and repair of roads not permanently improved and the remaining \$2,500 can be deposited as a sinking fund and bear interest so that the entire bond issue can be taken up at the end of 40 years with the amount in the sinking fund.

There are 22 modern steel bridges in Adams County, 11 concrete spans and 215 tile culverts. In addition to these the county has expended \$6,500 for gravel roads during the last 12 years making a total expenditure of \$142,817 for permanent improvements on public highways during that period.

Paving Estimates in New Haven

The estimates of money needed by the Permanent Pavement Commission of New Haven, Conn., to carry on the proposed work of the Commission during the coming year, have been completed and submitted to City Clerk Pallman. The Commission asks for a total of \$684,634.90 and sets forth in the estimates the probable cost of permanent pavements to be laid on approximately 50 streets.

The most important work which the Commission thinks should be undertaken during the coming year is the paving of Whitney Ave., from Sachem St. to Cliff St., the estimated cost of which will be \$90,000.

Other jobs planned and the amount they will cost is figured by the Commission as follows: George St., from College St. to Winthrop Ave., and Winthrop Ave. to Derby Ave., \$63,000; College St. from George St. to Grove St., \$23,000; Congress Ave. from Howard Ave. to the West River Bridge, \$40,000; Elm St. from Kensington to Pendleton St., \$27,000; Greenwich Avenue from Kimberly Ave. to Sea St., \$18,000.

There are over forty other smaller jobs mentioned in the estimate, and it is the opinion of the commission that all of them should be done as soon as possible. The appropriation asked by this department for the coming year is about half a million greater than that requested last year.

Time Limit on State Road Contracts

C. Gordon Reel, State Superintendent of Highways of New York, is formulating a plan, with the assistance of the Attorney General, for placing a time limit on contractors building state roads.

The general outline of the plan provides that in case of failure on the part of the contractor to complete the work within the time specified, the state will relet the contract to another contractor, and should the cost exceed the amount of the first award, the original contractor or his bondsmen will be compelled to make up the difference to the state.

It is expected that one result of this plan will be to prevent contractors from assuming more contracts than they can perform within the time limit designated.

To Build Roads in Macon, Ga.

Representative committees from Jones, Baldwin and Crawford Counties in Georgia are co-operating with a Bibb County committee and are making arrangements for the construction of an automobile highway from the county seats of each of the three counties to Macon, county seat of Bibb Co.

A short time ago a committee from Baldwin County met with the good roads committees of Jones and Bibb Counties, and a campaign was launched to build a new highway from Milledgeville to Macon, thence to Gray, the Jones county seat, as soon as the necessary funds could be raised.

A committee from Crawford County is also urging the citizens of that county to help to construct a new highway from Macon to Roberta, the county seat of Crawford County. The matter is now in the hands of the Chamber of Commerce of Macon, and it is thought probable that it will support the Crawford County committee in the project. It is believed that the new highways will be the means of important increases in the business of the Macon merchants and they strongly favor the project.

New Road Across New Jersey

State Road Commissioner Stevens of New Jersey has approved specifications for the Burlington County end of the proposed gravel road which is to be built from Brown's Mills to Lakehurst, which will complete the shortest cross state route from Philadelphia to the New Jersey coast resorts.

The Board of Freeholders are already asking for bids for the construction of their section. After this highway has been finished practically all the automobile traffic from Philadelphia to the sea shore will be through Mount Holly, Brown's Mills, Lakehurst and Lakewood.

Senate Passes Road Bill

By a vote of 37 to 21 the United States Senate, Aug. 12, adopted the Senate substitute to the House provision in the post office appropriation bill extending Federal aid to the states in the improvement of highways.

The amendment creates a commission to investigate the feasibility of Federal aid in the construction of a comprehensive system of good roads.

The House provision contemplated a scheme of Federal aid with an annual appropriation of \$15,000,000 for that purpose.

Coming Meetings

Aug. 27-29.—League of Third Class Cities of Pennsylvania.—Annual Convention, Wilkesbarre, Penn.

Aug. 27-29.—Union of Canadian Municipalities.—Annual Meeting, Windsor, Canada. Secy.-Treas. W. D. Lightall, 305 Quebec Bank Bldg., Quebec, P. Q.

Sept. 2-7.—International Association for Testing Materials.—Sixth Congress, Engineering Societies Bldg., 29 W. 39th St., New York, N. Y. Secy., H. F. J. Porter, 29 W. 39th St., New York, N. Y.

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

An election will be held Sept. 21 in Williamsburg, Ky., to vote upon the question of issuing \$300,000 in bonds for building roads.

At a recent special meeting of the County Commissioners of Pinellas County, Fla., it was decided to call an election for a \$350,000 bond issue for the purpose of building roads in the county.

An election will be held Sept. 17 in Dade County, Fla., to decide the question of issuing \$300,000 in bonds, the proceeds of which will be used for the improvement of the roads of the county.

The Board of Local Improvements of Peoria, Ill., has inserted a clause in a paving ordinance that none but union made brick should be used in the work in question, thereby leaving the matter to be decided by the action of the City Council.

Gov. J. M. Brown of Georgia has vetoed the bill giving the city of Atlanta the right to bridge the Western and Atlantic Railroad tracks at the Pryor St. and Central Ave. crossings. It is said that the fight for the measure authorizing the work will not be stopped by the veto.

The position of road supervisor of Abbeville, La., which was created by the police jury at a recent meeting, has been abolished upon petition by the road overseers. W. D. Lyons was the incumbent of the position.

The Illinois Highway Improvement Association will hold its fall meeting at Peoria on the afternoon and evening of Sept. 27. The Automobile Club of Peoria is to take a leading part in the preparations, and invitations will be sent to the Governor and members of the Legislature and other leading citizens of the state who are interested in the work of improving highways.

After a conference between officials of the State Highway Commission of Minnesota and engineers of the Canadian Government with reference to the joining of the first international road between Duluth and Port Arthur, Ont., it was decided that the point where the road should cross the line would be Johnson's Landing, on Pigeon River, in Cook County, Minn., about eight miles west of Lake Superior. An international bridge will be built at that point. The Canadian section of the road is nearing completion, and Cook County is issuing bonds for defraying the expenses of the cost of construction this section.

Personal Notes

George S. Hartshorn, City Engineer of Woburn, Mass., died Aug. 3.

T. H. Mandell has been elected City Engineer of Lake Charles, La.

R. P. Coble, of Oxford, N. C., has been appointed County Engineer of Lee county, that state.

J. B. Logan, formerly engineer with the Maryland State Roads Commission, has been appointed City Engineer of Annapolis, Md.

The Council of the Society of American Automobile Engineers has passed resolutions deploring the recent death of Henry F. Donaldson, president of the society.

C. E. Leonard, a civil engineer of Abilene, Tex., has been appointed superintendent of the construction of the paving of the business streets of Taylor, Tex.

Prof. Wm. J. Carroll, associate professor of civil engineering at the State University of Kentucky, has been appointed bridge engineer of the Kentucky State Highway Commission.

Frederick Rhodes, of San Diego, Cal., formerly County Engineer of San Diego Co., has been appointed engineer

in charge of the construction of a road between Mountain Springs and Coyote Wells, Cal.

E. W. Robinson, for three years Assistant City Engineer of Webb City, Mo., has been appointed City Engineer to fill the vacancy caused by the resignation of A. J. McKenzie, who will engage in construction work.

C. J. Grinalds, who has been connected with the Topographical Survey Commission of Baltimore, Md., for the past three years, has been appointed Assistant Engineer in the Department of the Commissioners for Opening Streets of the city of Baltimore.

Trade Notes

"Ransome Unit Construction" is the title of a 28-page booklet recently issued by the Ransome Engineering Co., of New York City. The contents are devoted to illustrated descriptions of concrete construction in which the Ransome "unit" system was used.

The Geiser Manufacturing Co. of Waynesboro, Pa., has just issued an attractive triple folder describing the Peerless road rollers manufactured by the company. The folder is amply illustrated and is printed in brown ink on cream-colored paper, with brown embossed cover.

The July issue of "The Harvester World," a periodical published by the International Harvester Co., Chicago, Ill., marked the tenth anniversary of the formation of the company. The leading article is entitled "The Record of Ten Years," and comprises a condensed resume of the policies and methods of the company and what has been accomplished during the period of its existence. Practically the entire 40 pages of the number are devoted to a description of the products of the company's manufacturing plants and the uses to which they are put in various parts of the world.

Employees of the Street Department of the city of Portland, Ore., under the direction of the City Engineer, recently constructed a street 400 ft. in length on Adams St., between Holladay Ave. and the end of the new steel bridge, in ten hours. The need for hurry was occasioned by the opening of the bridge to team, automobile and pedestrian traffic. When the bridge was first opened the approach on Adams St. was little more than a mudhole, and wagons passed over it with difficulty. Within a few hours the way was safe for teams, and by night the road was finished for temporary use, the course being built up several feet and rolled solidly.

CONTRACT NEWS

CONTRACTS PENDING
ROADS AND STREETS.

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ROADS AND STREETS

Bids Asked and Prospective Work.

Cullman, Ala.—The Cmrs. Court of Cullman Co. will on Aug. 31 receive sealed bids for the macadamizing of two of the leading public roads.

Gadsden, Ala.—Etowah Co. will build a link in the road between Gadsden and Birmingham.

Little Rock, Ark.—The City Council at a meeting Monday voted to make an appropriation of \$2,500 for aiding the Cmrs. in paving West Fifth St.

Little Rock, Ark.—Bids will be received up to Aug. 28 for grading, draining and curbing West Thirtieth St. from May to Peyton. H. S. Nixon, Sec.

Jacksonville, Fla.—Sealed bids will be received by the Bd. of Cmrs. of Duval Co. at its office in the courthouse, Jacksonville, until 10 a. m., Aug. 30, 1912, for the paving of the Camp site road from New York Ave. to the state military camp grounds. Specifications and other data will be furnished upon application to C. W. Ellis, Chmn. of the Bd.

Arcola, Ill.—The City Council passed ordinances for paving West Main and Pine Sts. at the regular August monthly session.

Bartonville, Ill.—An ordinance was adopted providing for the paving and general improvement of Adams St. sidewalk. Address City Clerk.

Canton, Ill.—At a recent meeting of the Bd. of Local Imps. favorable action was taken on a petition filed by the Parlin & Orendorff Co. asking for the pavement of

East Walnut St., from the east line of Second Ave. to the east line of Fourth Ave.

Peoria, Ill.—An ordinance was adopted providing for the paving and general improvement of Adams St.

Rockford, Ill.—Brick pavement for East State St. from South Third St. to the city limits and for Charles St. from State to Seventh Sts. was ordered by the Bd. of Loc. Imp. when the City Atty. was instructed to prepare the necessary ordinance for this improvement.

Springfield, Ill.—Ordinances authorizing the paving of Miller St. from Fifth St. to Seventh St. and Eighth St. from Scarritt to South Grand Ave. were passed by the City Council.

Wood River, Ill.—The Village Council of Wood River has a plan under way whereby within another year the main streets will be paved.

Aurora, Ind.—Sealed bids will be received until Sept. 3 for the improvement of certain public highways in Washington Twp., Dearborn Co. W. S. Fagaly, Co. Aud.

Salem, Ind.—Sealed bids will be received until Sept. 2 for the construction of the Pekin and Halo Road in Pierce Twp. Frank S. Munkelt, Aud.

Sealed bids will be received by the Bd. of Cmrs. of Washington Co. until Sept. 2 for the construction of the McDonald, et al road in Washington Twp. Frank S. Munkelt, Aud.

Clarion, Ia.—A survey is being made for paving a number of streets throughout the city. Address Pres. Bd. of Loc. Imp.

Clear Lake, Ia.—The Council is planning to pave ten blocks of city streets. Address Co. Clerk.

Bonner Springs, Kans.—The paving of the main business streets of Bonner Springs is now assured. The City Council today advertised for bids on the work.

Erie, Kans.—The city of Erie will arrange for the paving of several streets throughout the city.

McPherson, Kans.—City Engr. H. A. Rowland has prepared plans for the paving of South Main St. and Kansas Ave. Bids will be advertised for at once. Address City Engr. Rowland.

Wichita, Kan.—Bids will be received Aug. 29 for the construction of section C storm water sewers No. 9. Address Wm. Sence, City Clerk.

Louisville, Ky.—An ordinance was passed for improving a part of Fortieth St. from the south curb line of Chestnut St. to the center line of Elliott Ave.

An ordinance was passed for improving a part of Fortieth St. from the center line of Elliott Ave. to the north curb line of Broadway.

Ann Arbor, Mich.—The Bd. of Pub. Works has ordered the paving of Oswego and Hill Sts. after the completion of the job on Mary St., should the plan meet with the approval of the City Engr.

Meridian, Miss.—The City Engr. was authorized to prepare and advertise for bids, to be opened Sept. 6, for paving certain streets to connect with Lauderdale Co. good roads, only plastic paving material to be used.

Poplar Bluff, Mo.—The City Council has passed ordinances authorizing the paving with vitrified brick of eleven streets, or about twenty-eight blocks, comprising the business section of the city.

Shreveport, La.—Bids will be received by the Police Jury of Caddo Parish at Shreveport, La., until noon Sept. 12 for grading and surfacing with gravel or broken stone five miles of the Hart's Island Road. Specifications on file with the Parish Engr. J. T. Bullen is Parish Engr.

Newark, N. J.—The following ordinances have been passed: To provide for the paving of First St. from Orange St. to the Morris Canal with brick pavement on a 6-in. concrete foundation; to provide for the paving of Bonykamper Ave. from Hawkins St. to Christie St. with oblong granite block pavement on a 6-in. concrete foundation; to provide for the paving of Ashland St. from Fourteenth Ave. to South Orange Ave. with brick pavement on a 6-in. concrete foundation; to provide for the paving of First Ave. from Third St. to Bloomfield Ave. with brick pavement on a 6-in. concrete foundation;

to provide for the flagging of the sidewalks on the west side of Clinton Pl. from Randolph St. to Hawthorne Ave. and from Nye Ave. to Renner Ave., and on the east side of Clinton Pl. from Hawthorne Ave. to Renner Ave.; to provide for the flagging of the sidewalks on the east side of Christie St. from Bonykamper Ave. to Ferry St.; to provide for the paving of Christie St. from Bonykamper Ave. to Ferry St. with oblong granite block pavement on a 6-in. concrete foundation. Address H. B. O'Connell, Pres. of the Bd. of Street and Water Cmrs.

New York, N. Y.—Sealed bids or estimates will be received by the Pres. of the Borough of The Bronx at his office, in the Municipal Bldg., Third Ave. and 177th St., until 10.30 a. m., Aug. 27, 1912, for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Glebe Ave., from Westchester Ave. to Zerega Ave., together with all work incidental thereto; for constructing receiving basins and appurtenances at the northwest corner of Hunts Point Ave., Eastern Blvd., northeast corner of Hunts Point Ave. and Whittier St., northeast corner of Hunt Point Ave. and Longfellow Ave., northeast cor. of Hunts Point Ave. and Falle St., northeast corner of Spofford Ave. and Coster St., northeast corner and northwest corner of Spofford Ave. and Manida St., together with all work incidental thereto; for regulating, regrading and paving with granite blocks on a sand foundation the roadway of Burnside Ave., from a aqueduct Ave. to the westerly side of Sedgwick Ave., and setting, resetting or relaying curb, flagging and crosswalk where necessary, together with all work incidental thereto (preliminary pavement); for paving with asphalt blocks on a concrete foundation the roadway of Mosholt Parkway South, from Briggs Ave. to Van Cortlandt Ave., and setting curb where necessary, together with all work incidental thereto (permanent pavement); for paving with bituminous concrete on a cement concrete foundation the roadway of St. Lawrence Ave., from Walker Ave. to Merrill St., adjusting curb where necessary, together with all work incidental thereto (preliminary pavement); for paving with bituminous concrete on a cement concrete foundation the roadway of Coster St., from Lafayette Ave. to Randall Ave., adjusting curb where necessary, together with all work incidental thereto (preliminary pavement); for paving with asphalt blocks on a concrete foundation the roadway of Bryant Ave., from E. 172d St. to E. 174th St., and setting curb where necessary, together with all work incidental thereto (permanent pavement); for paving with asphalt blocks on a concrete foundation the roadway of Teller Ave., from E. 164th St. to E. 167th St., setting and resetting curb where necessary, together with all work incidental thereto (permanent pavement); the paving with bituminous concrete on a cement and concrete foundation the roadway of Commonwealth Ave., from Walker Ave. to Merrill St., and adjusting curb where necessary; paving with bituminous concrete on a cement concrete foundation the roadway of Walton Ave., from Fordham Rd. to Burnside Ave., and adjusting curb where necessary.

Sealed bids or estimates will be received by Geo. McAneny, Pres. of the Borough of Manhattan, at the City Hall, room 14, until 2 p. m., Tuesday, Aug. 27, 1912, for regulating and repaving with vitrified shale block pavement on a concrete foundation the roadway of Second Ave., from the north side of Fifth St. to north side of Seventh St.; for regulating and repaving with Durax cube granite block pavement on a concrete foundation the roadway of Second Ave., from the north side of Fifth St. to the north side of Seventh St.

Bids will be received by Cyrus C. Miller, Pres. Borough of Bronx, at his office, in the Municipal Bldg., Crotona Park, 177th St. and Third Ave., until 10.30 a. m., Aug. 27, for furnishing and delivering 100,000 gals. of asphalt road oil, and for furnishing and delivering broken trap rock stone and screenings.

Athens, O.—An ordinance determining to proceed with the improvement of Grosvenor St. from the south line of lot No. 2062 to the north line of lot No. 1509 by grading, draining and paving the same has been passed by the City Council.

Canton, O.—A resolution was passed declaring it necessary to improve South

Cleveland Ave. from Cedar St. to Fairfield Ave. by grading and paving.

An ordinance was passed to issue bonds for the purpose of paying the city's portion of the improvement of East Lake St. from St. Elmo St. to Market St.

The first steps towards the improvement of East Second St. from Cherry St. to the East Creek by paving, grading, flagging, curbing and providing drainage was recently taken by Council, when it adopted a resolution instructing the City Engr. to draw up plans and estimate the cost of the work.

Cheviot, O.—Sealed bids will be received by the Clerk of the Village of Cheviot, at his office, No. 3507 Harrison Ave., Cheviot, O., until 12 o'clock noon on Aug. 30, 1912, for furnishing the necessary labor and materials for the improvement of St. Martins Pl. from Glenmore Ave. to the east line of lot No. 19 of Bruns, Schneider and Lacher's subdivision, by grading, setting combined cement curb and gutters, macadamizing the roadway and rolling the same and constructing the necessary basins and drains, in accordance with the plans, specifications, estimates and profiles now on file in the office of the Village Clerk.

Cincinnati, O.—Park Engr. Meeds has drawn up plans for a vehicle road through Eden Park connecting Mt. Adams and Walnut Hills. He estimates the cost at \$75,000, with an additional cost of \$50,000 for an ornamental bridge over the park driveway.

Cincinnati, O.—The following ordinances have been approved by the City Council: Determining to proceed with the improvement of Standish Ave., from Beecher to Mellish Ave.; determining to proceed with the improvement of E. Eighth Ave., from a point 126 ft. east of the east curb of Broadway to Eggleston Ave.; determining to proceed with the improvement of McMakin St., from Jo William St. to Delaney St.; to issue bonds in the sum of \$500,000 for the purpose of resurfacing, repairing and improving certain existing streets and public highways in the city of Cincinnati; determining to proceed with the improvement of Gholson Ave., from Reading Rd. to Washington Ave.; determining to proceed with the improvement of Isabella St., from the northern end of the present improvement to Markbreit Ave.

Columbus, O.—Sealed bids will be received at the office of the State Highway Comr., Columbus, until 1 p. m., Aug. 31, 1912, for the following highway work: Grading and paving with water bound macadam, 7,920 lin. ft., 10 ft. wide, of the Belfast-Fairfax Rd., in Jackson Twp., Highland Co.; grading and paving with water bound macadam, 5,985 lin. ft., 10 ft. wide, of the Jackson-Chillicothe Rd., in Liberty Twp., Jackson Co.; for grading and paving water bound macadam, 4,665 ft., 10 ft. wide, of the Jackson-Centerville Rd., in Lick Twp., Jackson Co.; for grading and paving with water bound macadam, 7,235 ft., 10 ft. wide, of the Jackson and Maybee Rd., in Jefferson and Hamilton Twps., Jackson Co.; for grading and paving with water bound macadam, 11,871 lin. ft., 10 ft. wide, of the Jackson and Piketon Rd., in Liberty Twp., Jackson Co.; for grading and paving with water bound macadam, 5,645 lin. ft., 14 ft. wide, of the Jackson and Richmondale Rd., in Lick Twp., Jackson Co.

Sealed proposals will be received at the office of the State Highway Comr., Columbus, O., until 10 a. m., Aug. 29, 1912, for the following highway work: Grading and paving with bituminated concrete, 5,300 lin. ft., 10 ft. wide, of the State road, in Florence Twp., Erie Co.; grading and paving with bituminous bonded macadam, 5,700 lin. ft., 10 ft. wide, of the Upper Sandusky Rd., in Grand Prairie Twp., Marion Co.

Dayton, O.—An ordinance was passed determining to proceed with the improvement of alley north of Cottage Grove Ave. from alley east of Salem Ave. to Bellevue Ave.

Fremont, O.—Sealed bids will be received until Sept. 4 for improving Rawson Ave. by paving, etc. R. W. Williams, Clerk.

Lorain, O.—Petitions are out asking for the paving of several streets of the city. The residents of East Thirtieth St. between Vine Ave. and Clinton Ave. are asking for asphalt paving.

Marietta, O.—An ordinance was passed determining to proceed with the improvement of Wooster St. from Seventh St. to Eighth St. by paving.

An ordinance was passed determining to proceed with the improvement of Tupper St. from Fifth St. to Seventh St. by paving.

An ordinance was passed determining to proceed with the improvement of Cutler St. from Fifth St. to Sixth St. by paving.

Marion, O.—Bids for the resurfacing of Church St. from Blaine Ave. to Elm St. with sheet asphalt will be received up to Aug. 26.

Niles, O.—The Bd. of Control will advertise for bids for the North and South Main St. paving, bids to be opened Aug. 28.

Toledo, O.—An ordinance was passed determining to proceed with the improvement of the alley between Monroe St. and Bishop St., from Albion St. to Princeton St., by grading and paving.

An ordinance was passed determining to proceed with the improvement of Mulberry St. from Ontario St. to Champlain St. by grading and paving.

An ordinance was passed determining to proceed with the improvement of Avalon Pl. from Summit St. to Superior St. by grading and paving.

An ordinance was passed determining to proceed with the improvement of St. Clair St. from Monroe St. to Emerald Ave. by repaving.

Oklahoma City, Okla.—A resolution was passed declaring it is necessary to pave Francis Ave. from the north line of Fourth St. to the south line of Ninth St.

Harrisburg, Pa.—The State Highway Department will receive bids at Harrisburg Aug. 30 for constructing about 100,000 lin. ft. of state roads. Edward M. Bigelow is State Highway Comr.

Johnstown, Pa.—The Cmrs. of Stonycreek Twp., which has been a township of the first class since the new census was taken, at a special meeting instructed Twp. Engr. O. F. Themus to advertise for bids for the reconstruction of 3,000 ft. of the Hollow Road from the Johnstown city limits up to Solomon's Run.

Towanda, Pa.—Bids will soon be advertised for paving streets in this city. Address Benjamin Kuykendall, Esq.

Columbia, S. C.—Extensive permanent improvements will be made at Elmwood Cemetery. The Elmwood Cemetery Company is planning to spend about \$20,000 on paving, waterworks system, storm sewers and parking.

Austin, Tex.—The City Engr., G. S. Iredeil, was directed by the City Council to draw up the specifications for 17 blocks of permanent paving on Lavaca and 19th Sts. and University Ave.

Houston, Tex.—Announcement was made that signatures of two-thirds of the property owners between the city limits and Milby St. have been obtained for street paving in that vicinity.

Beaver Dam, Wis.—The Council is planning to pave many streets. Address City Clerk.

Janeville, Wis.—Improvement of Jefferson Ave. from Ruger to Oakland Ave. by grading and paving, and surfacing with crushed stone, was provided for in a resolution passed by the City Council at its adjourned meeting.

Racine, Wis.—The Council is planning to improve Park Ave. from Sixth St. to Water St. Address Mayor Goodland.

Bids Received and Contracts Awarded

Detroit, Mich.—The Council Com. on Parks and Blvds. has awarded a \$33,000 paving contract to Carpenter & Anderson, of Grand Rapids.

Philadelphia, Pa.—Richard P. Bennis, of Philadelphia, was awarded the contract for the construction of 18,000 sq. yds. of South Bethlehem St. paving on a bid of \$31,990.50.

BRIDGES

Bids Asked and Prospective Work

Ashtown, Ark.—Bids will be received Aug. 30 for furnishing all material for the erection complete of a bridge over Little River between Little River and Sevier Cos. Address N. A. George, Co. Judge of Little River Co.

Colorado Springs, Col.—Plans and specifications for a new steel bridge over Monument Creek to replace the wooden one which was washed out some time ago are being prepared under the direction of the El Paso Co. Cmrs. and bids for the construction work will be asked for within a few days.

Lacon, Ill.—Sealed proposals will be received at the City Hall by the Mayor and City Council until Sept. 3, 1912, for the construction of a bridge. Proposals will be received on two separate sets of plans prepared by the Illinois State Highway Com. Address Mayor.

Libertyville, Ill.—The Town Bd. is considering specifications for a \$5,000 bridge

across the Des Plaines River. Address Town Clerk.

New Albany, Ind.—City Engr. C. W. Appleby of New Albany has completed plans for the reconstruction of the bridge over Falling Run at West Second St., which was wrecked last spring by high water.

Richmond, Ind.—The Co. Cmrs. of Wayne Co. have approved the plans for eight bridges to be built and repaired this summer and will at once advertise for bids. The large bridges are the Swain bridge with a span of 90 ft.; the Wasson Ford bridge, with a span of 75 ft., and the Thornburg bridge, with a span of 75 ft. Address Co. Engr.

South Bend, Ind.—Bids will be received Aug. 26 for the construction of one Eldred bridge, flat top; Shafer bridge, flat top, one beam, and Rose bridge, flat top, one beam. All proposals shall be based upon the plans and specifications now on file in the Auditor's office. Address Clarence Sedgwick, Aud.

Terre Haute, Ind.—Nathan Wallace, Co. Aud., will advertise for bids for the construction of the proposed John Barbazette bridge in Pierson Twp. The bridge will be built of reinforced concrete.

Vincennes, Ind.—The Bd. of Comrs. of Knox Co. will receive sealed bids up to 2 o'clock p. m. of Tuesday, Sept. 3, 1912, for the following: No. 8, 16-ft. bridge across Spangle ditch on Armuth Road in Vigo Twp.; No. 20, 45-ft. bridge, low truss, across Singer ditch two miles west of Sandborn in Vigo Twp. As per plans, specifications, estimates, etc., now on file in the office of the Auditor of Knox Co. Address John T. Scott, Co. Aud.

Bettendorf, Ia.—A bill providing for the construction of a new bridge across the Mississippi River between Bettendorf and Moline has been approved by the United States Senate.

Topeka, Kans.—The City Cmrs. have announced that they are contemplating calling an election for the purpose of voting \$177,000 in bonds to rebuild practically all of the old bridges inside the city limits.

Wichita, Kans.—The Co. Cmrs. of Jefferson Co. expect to let the contract in the near future for the construction of five new steel bridges over streams in that county.

Denmark, Me.—Sealed proposals for building a reinforced concrete bridge in the town of Denmark will be received by the Selectmen of Denmark until Sept. 1, 1912. Plans and specifications may be obtained from the Selectmen of Denmark.

Monguagon, Mich.—The Township Bd. is considering the proposition of issuing bonds for the construction of two new bridges on the Horse Mill and Church Rds., to cost in the neighborhood of \$10,000. The issue will be decided by a popular vote at the regular November election.

Springfield, Mo.—C. E. Phillips was instructed to prepare plans and estimates of the cost of repairing the Jefferson Co. viaduct.

Ord, Neb.—Sealed proposals will be received Sept. 5 for the erection and construction of a bridge upon Will Ave. in the city of Ord, between Pete and Babcock Sts. Address Ira D. Tolen, City Clerk.

Freeport, N. Y.—The Bd. of Spvrs. has decided to erect three new bridges with steel girders and concrete base in place of three wooden bridges on the Merrick Rd., east of Main St.

Middleport, N. Y.—The canal officials have asked for bids for the erection of a lift bridge over the Erie Canal at Main St. The new bridge will be erected this fall and will be of sufficient weight and strength to permit the operation of cars over it.

Cleveland, O.—Sealed proposals will be received until Sept. 11 for the construction of bridge work, per report No. 2968, retaining wall Lewis Road, Olmsted Twp. John F. Goldenbogen, Cuyahoga Co., Clerk.

Hamilton, O.—The Co. Cmrs. and Engr. have approved the layout plans prepared by Engr. L. A. Dillon for a new canal bridge at High St. and directed Co. Aud. Crawford to ask for bids for the contract, the same to be opened Sept. 7.

Lawrence, O.—Bids will be received Sept. 12 by Geo. J. Gearhart, Co. Aud. of Fairfield Co., for the construction and completion in place ready for travel of a steel superstructure for the Pin bridge in Berne Twp. with reinforced concrete floor; extreme length, 82 ft. 6 ins.; clear roadway, 14 ft.

Troy, O.—Bids will be received Sept. 3 by Mahlon T. Staley, Co. Aud. of Miami Co., for furnishing the material and performing the labor necessary for the completion of Creodone, creosote or Kreodone treated wood block floor on the Laura bridge, Creodone, creosote or Kreodone treated wood block floor on the Gruber bridge and a concrete and steel bridge over the Hydraulic Canal at South Downing St., Piqua, O.

Durant, Okla.—The Co. Bd. of Cmrs. of Bryan Co. has called for bids for the construction of six new bridges in various portions of the county.

Margum, Okla.—Co. Cmrs. of Jefferson Co. expect to let the contract in the near future for the construction of five new steel bridges over streams in that county.

Stillwater, Okla.—Bids will be received Sept. 3 by the Cmrs. of Payne Co. for the construction of the following bridges: Four 30-ft. I beams, per plan marked Exhibit No. 1A; one 50-ft. steel truss bridge, two 60 ft. steel truss bridges, marked Exhibit 1C and 2C; one 90-ft. steel truss bridge and one 40-ft. steel truss bridge. Bids will also be received at the same time for the five steel truss bridges mentioned above, including steel, lumber and erection. Address E. M. Hamlin, Co. Clerk.

Bethlehem, Pa.—At a joint meeting of the Cmrs. of Northampton and Lehigh Cos., the Joint Bridge Cmrs. of this city suggested that a high bridge be erected from the Fetter House to a point in South Bethlehem. Cost, \$525,000. Address Chas. M. Schwab, or Warren A. Wilbur, of South Bethlehem.

Philadelphia, Pa.—Two new bridges are being planned by the Dept. of Pub. Works and it is expected that contracts for their construction will be awarded at an early date.

De Smet, S. D.—Sealed bids will be received at the office of Co. Aud. of Kingsbury Co. until Sept. 3 for the construction of slab reinforced concrete bridges. W. M. Look, Co. Aud.

Appleton, Wis.—A plan for a steel structure, to cost \$266,000, reaching from the foot of Prospect St. or Appleton to the Golf Grounds, is contemplated. Address City Engr.

Beaver Dam, Wis.—The Beaver St. bridge has been declared unsafe, and a bridge which will be of steel and concrete and consist of three spans will be erected. Bids will be advertised for soon. Address City Clerk.

Racine, Wis.—The Bd. of Pub. Works will arrange an investigation of the various bridges throughout the city with a view to repairs, rebuilding, new bridges, etc. Address Pres. of Bd.

BONDS

Milford, Ill.—An ordinance has been passed by the Village Bd. of Milford to submit to the voters a proposition to issue bonds to the amount of \$3,000 for paving purposes. Address City Clerk.

Shelbyville, Ill.—The Council will at once offer for sale \$21,000 5 per cent. paving bonds. Address Mayor F. P. Burns.

Escanaba, Mich.—The Bd. of Spvs. has been requested by the Co. Road Cmn. to submit to the voters at the November general election a proposition to bond Delta in the sum of \$100,000 for general road purposes.

Trout Lake, Mich.—Ten thousand dollars in bonds has been voted for road improvements. Address City Clerk.

Gulfport, Miss.—The Harrison Co. Bd. of Spvs. will issue bonds to the amount of \$15,000 for road improvements in Dist. No. 3.

Winona, Miss.—At a recent meeting of the Bd. of Spvs. of Montgomery Co. an election was ordered to be held on the 2nd of September for the purpose of ascertaining whether or not the issuance of the \$40,000 bonds for good roads in beat 1 will be accepted or rejected.

Plainfield, N. J.—Bids will be received Sept. 3 for the purchase of \$18,000 street improvement bonds. Address City Clerk MacMurray.

Cincinnati, O.—Bids will be received Aug. 29 for the purchase of \$38,000 street improvement bonds. Address Ira D. Washburn, City Aud.

Middletown, O.—Bids will be received Sept. 3 for the purchase of \$1,503 4½ per cent. paving bonds. Address Walter Gibbons, City Aud.

El Paso, Tex.—A special election will be held Aug. 27 to pass upon an El Paso Co. bond issue of \$150,000 for road purposes.

Lawrenceville, Va.—Bids for \$84,000 of Brunswick Co. road bonds will be received at the Clerk's office at Lawrenceville, Va., on Monday, Aug. 26, 1912, at 10 a. m. For particulars address W. T. Sledge, Clerk, Bd. of Spvs., P. O. Box 170, Lawrenceville.

Lookout Mountain, Tenn.—Twenty-five thousand dollars in bonds has been voted for the purpose of building and improving streets. Address City Clk.

Austin, Tex.—The Attorney General approved for registration an issue of \$10,000 in street improvement bonds for the city of Aransas Pass.

Levine, Tex.—Citizens of this precinct have issued a call for a special election to vote on the issuance of \$40,000 in good roads bonds.

MISCELLANEOUS

Chicago, Ill.—Sealed proposals will be received by the city of Chicago until 11 a. m. Aug. 29, 1912, at room 406, City Hall, for furnishing and delivering creosoted paving blocks at the intersection of the north branch of the Chicago River, about 17,000 ft. board measure of 4x6 in. and about 13,000 2x8 in.

Washington, D. C.—A commercial agent of the Department of Commerce and Labor has forwarded to the Bureau of Manufactures the name of a firm in the Netherlands which has manifested much interest in wood paving block machinery and would like to get catalogues from American manufacturers in this line. Address Bureau of Manufactures, Dept. of Commerce and Labor, file No. 9359.

White Castle, La.—The Secretary of the City Council has been instructed to secure gravel to begin paving lower Bowie St. for a distance of 7,000 ft. in order to meet the parish road on the south end of the corporate limits.

Forest, Miss.—W. W. Graves, Chmn. of the Road Cmrs. of Scott Co., is advertising for sealed bids for 12,000 yds. gravel to be used in road construction in District No. 1, of this city, the bids all to be in by Aug. 28.

History of Bridge Engineering

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NOTICE TO CONTRACTORS

STATE OF NEW YORK

Office of the State Commission of Highways, Albany, N. Y.

Pursuant to the provisions of Chapter 30, Laws of 1909, and Chapter 646, Laws of 1911, sealed proposals will be received by the undersigned at their office, No. 55 Lancaster St., Albany, N. Y., at one o'clock P. M. on Monday the 9th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County.	Road No.	Name.	Approx. Length.
Allegany	5312	Cuba-Friendship, Pt. 2	6.10	Onondaga	5365	Syracuse-Lafayette	7.00
Broome	5339	Binghamton City; Court St.	1.05	Orange	5328	West Point-Central Valley	11.20
Broome	5196	Harpersville-Onauqua	5.10	Oswego	5250	Central Sq.-Union Sq., Pt. 1	7.00
Chautauqua	5217	Jamestown-Bemus Point	7.95	Rensselaer	5354	Raymerville-Hoosick, Pt. 2	5.11
Chautauqua	5263	Dewittville-Mayville	5.51	Steuben	5312	Cemetery Hill; Hornell	0.61
Clinton	5197	Plattsburg City	1.79	Steuben	5319	Painted Post-Addison, Pt. 3	4.98
Clinton	5228	Rouses Point Village	2.21	Steuben	5351	Avoca Village	1.50
Columbia	5317	Hillsdale-Copake Iron Works	4.85	Steuben	5353	Hornell City; Canisteo St.	0.24
Delaware	5343	Grand Gorge-Stamford	12.11	Schuyler & Yates	5334	Watkins-Yates County Line	7.57
Delaware	5383	East Branch-Trout Brook	2.27	Suffolk	5301	Bayshore-Brookhaven	12.92
Delaware	5381	Margaretville-Halcottsville	6.23	Tompkins	5379	Ithaca-West Danby, Pt. 1	3.22
Dutchess	5326	Dover Plains-Pawling Town Line, Pt. 2	3.93	Washington	5316	Cambridge-Salem, Pt. 3	3.09
Greene	5367	Catskill-Athens	5.97	Westchester	5321	White Plains-Rye	1.64
Greene	5269	Coxsackie Village	2.31	Westchester	5357	Bronxville Village	0.95
Jefferson-Lewis	5332	Lowville-Carthage	11.33	Westchester	5358	Mt. Vernon City; Columbus Av.	0.28
Lewis	5327	Oneida County Line-Turin	14.77	Westchester	5359	Yonkers City; Central Park Av.	6.48
Madison	5329	Cazanovia-Morrisville	10.11	Westchester	5360	East View-Briarcliff Manor	5.04
Niagara	5319	Wrights Corners-Hartland	6.64	Westchester	5361	Briarcliff Manor Village	0.83
Niagara	5381	La Salle Bridge	0.09	Westchester	5362	Watkinsville Village	0.25
Oneida	5346	Remsen-Boonville Town Line	6.12	Westchester	5363	Peekskill Village	2.27
Oneida	5325	Whitesboro-Trenton	12.37	Westchester	5364	Ossining-Croton River	1.66
				Yates	5324	Dundee-Penn Yan	10.89

Sealed proposals will also be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at one o'clock P. M. on Tuesday the 10th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County.	Road No.	Name.	Approx. Length.
Albany	5105	Albany City; Central Ave.	0.75	Oswego	5382	Fulton-Oswego	12.80
Allegany	5341	Friendship-Belmont	6.80	Saratoga	5313	Stillwater Village	1.30
Broome	5377	Riverside Drive-Binghamton	1.91	Schoharie	5286	Howes Cave-Cobleskill	4.76
Broome	5338	Windsor-Deposit	13.84	Schuyler	5335	Watkins Village; Franklin St.	1.75
Chemung	1093	Elmira City; So. Broadway	1.12	St. Lawrence	5331	Gouverneur Village	1.73
Cattaraugus	5259	Salamanca-Little Valley, Pt. 2	6.86	Steuben	5348	Canisteo-Jasper	12.82
Chautauqua	5245	Bemus Point-Dewittville	5.97	Steuben	5352	Arkport-Dansville	10.38
Chautauqua	5320	Westfield Village	1.07	Suffolk	5232	Smithtown-Port Jefferson	11.25
Clinton	5199	Chazy-Rouses Point	8.25	Sullivan	5322	Monticello-Liberty, Pt. 2	8.45
Clinton	5337	Rouses Point-Canadian Line	2.36	Tioga	5333	Waverly Village	1.28
Delaware	5340	Colchester-Sullivan County Line	8.00	Washington	5336	Salem-Granville, Pt. 2	9.48
Greene	5366	Catskill Village	1.97	Washington	1082	Cambridge Village	1.71
Greene	5368	Athens-Coxsackie	4.65	Westchester	5371	Larchmont Village	0.95
Greene	5370	Coxsackie-Ravenna, Pt. 2	2.70	Westchester	5372	New Rochelle-Mamaroneck	0.73
Jefferson	5344	Carthage Village	2.12	Westchester	5373	Rye Village	2.85
Madison	5330	Morrisville-Bouckville	5.63	Westchester	5374	Pelham-New Rochelle	0.20
Madison	5380	Bouckville-Madison	2.45	Westchester	5375	Pelham Manor Village	1.34
Onondaga	5318	Canullus-Fairmont, Pt. 2	1.20	Westchester	5376	Mamaroneck Village	1.29
Oneida	5345	Trenton-Remsen	5.49	Westchester	(3)5355	Tuckahoe-White Plains, Pt. 1	2.43
Ontario-Yates	5323	Penn Yan-Halls Corners	8.15	Westchester	5356	White Plains Village	2.02
Orleans	5315	Medina Village	2.45	Wayne	5378	Ontario-Center-Williamson	4.50

After August 26, 1912, maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of Division Engineer Spencer J. Stewart, Realty Building, White Plains, N. Y., for highways in the counties of Dutchess, Orange, Suffolk, Sullivan and Westchester; at the home of Division Engineer Paul McLeod, Humare Building, Albany, N. Y., for highways in the counties of Albany, Clinton, Columbia, Greene, Rensselaer, Saratoga, Schoharie and Washington; also at the office of Division Engineer James H. Sturtevant, Cleveland Building, Watertown, N. Y., for highways in the counties of Jefferson, Lewis, Oneida and St. Lawrence; also at the office of Division Engineer Frederick Steel Strong, 433 South Salina Street, Syracuse, N. Y., for highways in the counties of Madison, Onondaga, Ontario, Oswego, Wayne and Yates; also at the office of Division Engineer James P. Morrissey, 423 Cutler Building, Rochester, N. Y., for highways in the counties of Allegany, Cattaraugus, Chautauqua, Niagara and Orleans; and also at the office of Division Engineer Perry Filkin, 901 Press Building, Binghamton, N. Y., for highways in the counties of Broome, Chemung, Delaware, Schuyler, Steuben, Tioga and Tompkins.

The special attention of bidders is called to "Information for Proposers" on pages 1 to 10 inclusive, of the specifications.

Proposals for each highway must be presented in a separate sealed envelope endorsed on the outside with the name and number of the highway for which the proposal is made.

Each proposal must be accompanied by a New York draft or certified check payable to the order of the State Commission of Highways for an amount equal to at least five per cent. of the amount of the proposal which such draft or check accompanies. This draft or check will be held by the Commission until the contract and bond are duly executed. The successful bidder will be required to give a bond for fifty per cent. of the amount of the contract; such bond to be executed by a Surety Company to be approved by the Commission, or a bond secured by the deposit of collateral securities to be approved by the Commission.

The right is reserved to reject any or all bids.

C. GORDON REEL,
Superintendent of Highways.
JOHN A. BENSEL,
State Engineer.
DUNCAN W. PECK,
Superintendent of Public Works.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, AUGUST 31, 1912

Number
9

Proposed \$50,000,000 Bond Issue in New York

Official advertisements have been published in various local papers throughout New York by Edward Lazansky, Secretary of State, announcing the fact that there is to be submitted at the general election on Nov. 5 a proposition for the issuing of bonds by the State Comptroller to the amount of \$50,000,000 for the purpose of constructing and improving state and county highways.

This refers to the law enacted April 12, 1912. An abstract of the law follows:

Section 1: There shall be issued bonds of the state in an amount not to exceed \$50,000,000, which shall be sold by the state, the proceeds thereof paid into the treasury and so much thereof as shall be necessary shall be expended for the purpose of constructing and improving state and county highways as defined in the state highway laws. These bonds are to be exempt from taxation.

Section 2: Bonds shall bear interest at a rate not to exceed 4 per cent. per annum, and shall be issued for a term of 50 years from their respective dates of issue, and shall be sold for not less than par.

The Comptroller is ordered to sell the bonds to the highest bidder after advertising for a period of 20 days in at least two daily newspapers, printed in the city of New York and one in the city of Albany. The bonds will be sold in such lots and at such times as may be required for the purpose of making partial or final payments on work contracted for in accordance with the provisions of the act.

An annual tax to pay the interest on each bond issue as it falls due and sufficient to pay and discharge the principal of the bonds within 50 years of the date of issue is authorized. The rate of the annual tax is designated as .005 of a mill on each dollar of valuation of real and personal property in the state subject to taxation for each million dollars or fraction thereof in par value of the bonds issued and outstanding during the fiscal year in which the amount of the tax is computed. The tax is to be assessed and collected in the manner prescribed by law and paid by the several county treasurers to the treasurer of the state. The proceeds of the tax shall be invested by the comptroller in securities in which he is authorized by law to make such investment. The proceeds of this tax shall constitute a sinking fund which will be used solely for the purpose of paying the principal and interest on the bonds in question.

Section 3: \$20,000,000 of the money authorized by the act shall be used solely for the construction and improvement of state highways as defined by section No. 3 of the state highway law, and \$30,000,000 shall be used for the construction and improvement of county highways as defined by section 3 of the state highway law.

Section 4: The State Commission of Highways is authorized, directly after the law takes effect, to equitably apportion among the counties containing towns the total amount of money authorized. The apportionment for the counties shall be computed on the following basis: On the population as fixed by the federal census of 1910; on the measured mileage of public highways outside of cities and villages as obtained in accordance with section 69 of chap-

ter 30 of the laws of 1909 and on the total area. The sum of one-third of each of these three factors thus obtained for each of the counties shall constitute an equitable apportionment.

Section 5: The routes of the state highways to be constructed and improved are those set forth in section 120 of the highway law.

Section 6: The routes of county highways which shall be constructed and improved are such as shall be determined by the commissioner of highways with the approval of the boards of supervisors of the respective counties, as set forth by the highway law.

Section 7: The work of construction shall be under the control of the state commissioner of highways.

Section 8: Any surplus arising from the sale of bonds over and above the cost of the work provided for by this act shall be applied to the sinking fund for the payment of bonds.

Section 9: The law shall not take effect until it shall have been submitted to the voters of the state at a general election and shall have received a majority of all the votes cast for and against it.

The election is designated as the general election to be held in November, 1912.

"Good Roads Days" In Alabama

"Good Roads Days," August 13, 15 and 16, which were designated as such in the state of Alabama, were observed by the citizens of over 40 counties in the state who took an active part in building and repairing roads on those days. It is stated that more work was done on the roads during those three days than during any other period of the same length in the history of the state. The people in some counties, notably Cullman and Walker, worked the roads during the entire week.

The idea of "Good Roads Days" in the state was promoted and the days themselves designated by the Alabama Good Roads Association, and it is said that an effort will be made to make them an annual institution.

Road Bond Elections In Texas

Road and bridge bonds to the amount of \$543,700 were voted in the state of Texas during July, according to a statement by the Texas Commercial Secretaries and Business Men's Association of Ft. Worth. Eight elections were held in seven different counties, and six of them were carried by large majorities.

A list of the counties holding road and bridge bond elections during the month follows: Henderson, held July 1, \$35,000, carried; Johnson, held July 18, \$75,000, carried; Lampasas, held July 20, \$12,500, defeated; Live Oak, held July 27, \$1,200, carried; Matagorda, held July 20, \$100,000, defeated; Robertson, held July 18, \$150,000, carried; Robertson, held July 28, \$100,000, carried; Tom Green, held July 2, \$70,000, carried.

Reports from the county judges and secretaries of the local commercial organizations throughout the state indicate that 73 counties constructed approximately 203 miles of new highways during the month.

Examinations for County Road Engineers in Kentucky

In accordance with the provision of the state road law recently enacted in Kentucky, examinations will be held during the first week in September at various points in the state, to secure eligibles for the position of county road engineer in the several counties throughout the state.

The applicants for the position of county road engineer will be examined on the following subjects: Theory and practice of road building, drainage, grades, earth-work computations, use and care of road machinery, maintenance of earth and macadam roads and such other subjects relating to road problems as the Commissioner of Public Roads may deem to be of importance. The examinations have been arranged so as to hold one examination in each Congressional district. The places and dates are as follows: Sept. 2, at Paducah, Louisville and Covington; Sept. 3, at Henderson, Frankfort and Ashland; Sept. 4, at Bowling Green, Danville and Paintsville; Sept. 5, at Elizabethtown and Middlesboro.

The examinations will be conducted by the State Commissioner of Public Roads or one of his representatives. It will be a written examination, the papers being collected and placed in envelopes, sealed and forwarded to the commissioner's office. Upon the completion of all examinations the papers will be opened and graded, and certificates will be issued to those successfully passing the examinations. These certificates will entitle the holder to the consideration of the county judge as eligible for appointment so far as technical qualifications are concerned, and the county judge will be responsible for determining the length of service and general qualifications of his appointee. Each county judge is asked to cooperate with the State Commissioner of Roads in securing eligibles from which appointments may be made.

Reputable engineers will not be required to take the examination for the office of county road engineer, the county judge being held responsible for the qualifications of any engineer who is employed upon his reputation as a civil engineer. It is recommended that civil engineers be employed wherever available.

The office of county road engineer will supplant that of county road supervisor which existed under the previous laws.

Plans for Main State Highway in California

The State Highway Commission of California has sent out surveying parties to lay out a route through the Tejon Pass for the proposed main state highway between Los Angeles and the San Joaquin Valley. It is understood that this will put an end to the controversy over the choice between the Tejon Pass and Tehachapi Pass, as members of the State Highway Commission, cooperating with several other engineers, have made a careful inspection of both routes and find the Tejon to be 50 miles shorter. Maps will be prepared and the necessary data filed, and as soon as the preliminary work is done contracts will be awarded for the work.

According to a statement by State Highway Commissioner Darlington, it is the opinion of the commission that the saving of 50 miles in the distance between Los Angeles and the San Joaquin Valley is of sufficient importance to the people of the state to justify the favorable consideration of the Tejon route.

While it is generally admitted that the Tejon route is much shorter than the proposed Tehachapi route, there have been strong efforts on the part of the people interested to induce the commissioners to select the latter route, it being pointed out that a road through the Tehachapi

district will benefit an agricultural section of considerable magnitude.

It is now believed that unless unforeseen obstacles arise the two proposed trunk highways, one along the coast and the other along the valley route, will be completed to San Francisco by the time the Panama Exposition opens in 1915.

One of the first half dozen sections of road to be built by the Commission runs out to San Diego for a distance of 8.6 miles. This will be the first stretch of state highway constructed in Southern California. Surveys have been ordered for the main trunk line from a point near Redding in Shasta County northward to the Oregon line, thus completing the route northward from Sacramento.

The state of Oregon is preparing to take up the work from its southern boundary and complete a comprehensive system of roads throughout the entire state.

Proposed New Street Work in Pittsburgh

The City Planning Commission of Pittsburgh, Pa., has recently made suggestions for the future improvement of the city's general layout and for the improvement of its street system which hint at recommendations for the establishment of new lines for a number of thoroughfares which are now considered to be too narrow, but which for one reason or another cannot be widened at present.

The commission recently recommended that provision be made for the eventual widening of Diamond St. and for the establishment of building lines for the new city hall and county building.

Several members of the Planning Commission are said to take the position that this general recommendation should be made in regard to other streets in the city. One of these streets is West Carson St., which it is argued may in future be widened to provide a broad thoroughfare to the west end district.

Ohio State Contracts To Be Let At Capital

State Highway Commissioner James R. Marker of Ohio has announced that hereafter all contracts for state road improvement will be awarded at the capital, Columbus, instead of at the various localities where the work is to be done. In other words, the work connected with the letting of contracts will be centralized and all bids will be received and computed and the contracts let at one place. It is believed by Mr. Marker that the new scheme will save time and generally be conducive to better results.

The new procedure was given a trial August 22 when bids for about \$200,000 worth of road work in a number of counties were received. Previous to the new ruling a representative of the department had been obliged to travel to local points and supervise meetings at which bids were to be received.

Highway Department to Exhibit at State Fair

Extensive preparations are being made by State Highway Commissioner James R. Marker of Ohio and his aides for making the annual exhibit of the State Highway Department at the State Fair, and it is expected that their efforts will result in a showing twice as large and comprehensive as last year.

One of the features will be exhibits of every standard type of roadway known, and in addition a miniature road crusher will be in operation and people interested will be able to see every step in the construction of the various types of road. Contractors and dealers in material are expected to cooperate with the state, and the federal government has also arranged to send exhibits.

GOOD ROADS

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AUGUST 31 1912.

Reorganization of the Maryland State Roads Commission

The engineering force of the Maryland State Roads Commission has been reorganized and a new plan adopted whereby the division of work is completely changed. The state has been divided into two divisions, each in charge of an assistant engineer, under whom are four resident engineers each in charge of a section. Surveys and general headquarters work are in charge of an assistant engineer.

The first division is in charge of Assistant Engineer Edwin F. Ruggles, and has four sections as follows: Baltimore City and Baltimore and Harford Counties, C. O. Gale, Resident Engineer, Baltimore; Carrol, Frederick and Howard Counties, C. A. Tenny, Resident Engineer, Frederick; Montgomery, Anne Arundel and Prince George's Counties, R. W. Owens, Resident Engineer, Washington; Allegany, Washington and Garrett Counties, L. T. Downey, Resident Engineer, Cumberland.

The second division is in charge of Assistant Engineer B. P. Harrison, and also has four sections as follows: Worcester, Somerset and Wicomico Counties, J. T. Baden, Resident Engineer, Salisbury; Dorchester, Caroline and Talbot Counties, Harry Waldorf, Resident Engineer, Easton; Calvert, Charles and St. Mary's Counties, C. R. Justi, Resident Engineer, La Plata; Kent, Cecil and Queen Anne's Counties, Edward Friese, Resident Engineer, Chestertown.

Assistant Engineer John N. Mackall, with headquarters at Baltimore, is in charge of the surveys and headquarters work.

The new system is designed to simplify the work, promote efficiency and reduce expense. Formerly one engineer was in charge of construction for a large section, another in charge of maintenance, and so on. This system necessitated much travel, which consumed a great deal of time and created large expense bills. Besides this, the engineer in charge of one class of work would often find himself on the same ground at the same time with another engineer in charge of another class. This condition is expected to be obviated under the new system, as the chief of each section will have complete charge in his territory, and owing to the fact that headquarters are centrally located, will be able to go to any work under his charge and return in one day on a motorcycle.

It is stated that the engineering force will be reduced about one-third as a result of the reorganization.

Road System Planned by Pacific Highway Association.

Among the resolutions passed at the recent convention of the Pacific Highway Association at San Francisco, Cal., was one inviting the Mexican government to extend the Pacific Highway from San Diego south to the Mexican capital.

Other resolutions were as follows: That the legislatures of Washington and Oregon appropriate adequate sums for the construction of those portions of the highway passing through their territories; that the federal government bridge the Colorado River at Yuma and the Columbia River at Portland; that all federal parks be thrown open to automobiles; that a yearly sum be appropriated from the revenues of the association for patrolling the route of the highway and for paying the salary of the executive officer at \$3,000 per year. It is said that this officer will probably be Major Henry L. Bowlby, formerly State Highway Commissioner of Washington.

National Tour of the American Automobile Association

The 1912 national reliability tour of the American Automobile Association, popularly known as the "Glidden" tour, which will start from Detroit, Mich., the second week in October, will run through Adrian, Ft. Wayne, Muncie, Anderson and Indianapolis to Louisville, thence to Nashville with two short detours, one to Lincoln Farm and the other to Mammoth Cave. From Nashville the tour will be made through Columbia, Tenn., to Florence, Sheffield and Tusculumbia, Ala., thence west to the Mississippi River at Memphis. From Memphis the tour will go south to Jackson, Miss., thence west to Vicksburg, and from there will either return to Jackson or go southeasterly below Vicksburg, entering the main route at a point below Jackson. The final course will be from Baton Rouge to New Orleans.

The Nashville, Tenn., "Democrat" will conduct a good roads and sociability run between Nashville and Huntsville, Ala., via the route of the Chicago and Gulf Highway, September 7. A pathfinding trip was recently made in the interest of the run over the proposed route.

The proposition of issuing \$1,000,000 for the construction of rock roads in Buchanan County, Mo., was defeated at an election held August 10. A majority of the voters of the city and county were in favor of the proposed issue, but, as the law requires a two-thirds majority, which was not secured, the issue was defeated.

The Board of Park Commissioners of Cincinnati has submitted to the City Council an estimate of the cost of the proposed traffic roadway through Eden Park, connecting Mt. Adams with Walnut Hills. According to this estimate a 35-ft. roadway would cost \$64,986. With a sidewalk the cost would be \$71,484.60, and the proposed bridge over the main driveway would bring the total to something over \$100,000.

The annual convention of the County Commissioners of the State of Pennsylvania will be held at Indiana, Sept. 10, 11 and 12. Among the events on the program are the following: Address on "The Board of Viewers' Act of 1911," by Joseph R. Strawbridge, York, Pa.; "Mistakes and Expenses," by A. M. Marsh, McKean County; "Good Roads," by Hon. E. M. Bigelow, State Highway Commissioner of Pennsylvania; "Inequalities in Tax Laws and How to Remedy Them," by J. D. Daugherty of Armstrong County; "Local Taxation of Public Utilities," by R. F. Bankert of Blair County.

Coming Meetings

Sept. 2-7.—International Association for Testing Materials.—Sixth Congress, Engineering Societies Bldg., 29 W. 39th St., New York, N. Y. Secy., H. F. J. Porter, 29 W. 39th St., New York, N. Y.

Sept. 30—Oct. 5. — American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

At a recent election held in Franklin, Texas, it was voted by a large majority to issue good roads bonds to the amount of \$100,000.

An order has been passed by the county commissioners of Marion County, W. Va., calling for a special election to be held in September for the purpose of voting on the proposition of issuing \$400,000 in bonds for paving and otherwise improving the roads of the county.

City Commissioner A. C. Hysmith of Paragould, Ark., has submitted a report showing that during the past four months there have been constructed in the city of Paragould nearly 80,000 lin. ft. of concrete paving.

The regular quarterly meeting and Ladies' Day of the Massachusetts Highway Association was held Thursday, August 15. The meeting took the form of an automobile trip to Lexington and Concord over the "Paul Revere" route to Lincoln, then via Concord and Bedford to Lexington Park, where a short business meeting was held and dinner served.

A suit to enjoin the town of Cicero, Ill., from awarding a paving contract to the Union Paving Co. has been filed in the Superior Court by the Citizen's Construction Co. The latter company alleges that bids for the contract were submitted to the Board of Local Improvements of Cicero on Aug. 5, and that its bid was \$63,332, whereas the bid of the Union Paving Co. was \$63,798.

L. F. Neefe, Chief Clerk of the Highway Department of Pennsylvania, recently made a tour of inspection of the highway departments of several other states in order to study their system and methods in the award of contracts and maintenance work. Mr. Neefe visited Trenton, Albany, Boston and Hartford and looked over the work in the vicinity of New York City. At the same time Commissioner Bigelow was engaged in inspection work in Ohio and adjoining states.

The United States Government has abandoned the use of wooden culverts in the drainage system of the irrigation lands in the Minidoka project, Idaho, one of the government's reclamation projects, and has installed various sizes of the Canton Culvert Company's corrugated metal culverts. The culverts are used for carrying drains under small irrigation laterals and public roads. The wooden culverts, which were of the rectangular box type, made of 3-in. pine, stiffened with inside collars and built in 16-ft. lengths, were installed with considerable difficulty on account of the quicksand, which often prevented their being set to the proper grade without considerable additional expense.

Personal Notes

T. H. Mandell has been elected City Engineer of Lake Charles, La.

C. L. Proctor has been appointed City Engineer of Hornell, N. Y.

Marsden Manson, for several years City Engineer of San Francisco, has resigned.

Peter J. Owens has been appointed Superintendent of Street Cleaning of San Francisco, Cal.

David H. McCoy has been appointed Superintendent of Street Repairs of San Francisco, Cal.

Prof. William J. Carrell of the department of civil engineering of the State University of Kentucky has been appointed Bridge Engineer of the State Highway Department of Kentucky.

Walter N. Polakov, a consulting engineer of the Board of Estimate and Apportionment, New York City, has become associated with the firm of Day & Zimmerman, Philadelphia, Pa.

Carlos T. Prall, president of the Oregon Association for Highway Improvement, has resigned in order to pay more attention to his personal business. Samuel Hill is being prominently mentioned as his successor.

William Morrison has been appointed Assistant City Engineer of Cincinnati, at a salary of \$125 a month.

R. R. Govin of the banking firm of Hollins & Co., has been elected President of the United States Asphalt Refining Co., to fill the vacancy occasioned by the recent death of Walter S. Wilkinson. Philip Walter Henry has been elected a member of the Board of Directors in place of Mr. Wilkinson.

George C. Mills of Rochester has been appointed Assistant Engineer of the State Department of Highways of New York at a salary of \$2,400 a year. The State Civil Service Commission has waived examination in the case of Mr. Mills in view of his thirty years' experience as an executive engineer and his general qualifications for the position.

Trade Notes

The Pittsburgh Amiesite Co., of Pittsburgh, Pa., has purchased a Ruggles-Coles Class F—O machine for drying sand and stone.

The Gardner Crusher Co., 506 W. 34th St., New York City, has recently issued a booklet describing its disintegrator and pulverizer. The text is elaborately illustrated with halftones and line cuts, showing the various models of the crusher complete and parts thereof, and also showing the machine at work.

A catalog, descriptive of the Chicago Improved Cube Mixer, manufactured by the Municipal Engineering & Contracting Co., Chicago, Ill., has recently been published by that company and is being distributed among the trade. The booklet is attractively compiled and comprises 72 pages and cover. It contains many illustrations of the various types of the Chicago mixer, and the uses to which it is adapted. Illustrations show the mixer at work under various conditions.

Leroy A. Kling has been appointed sales manager of the road machinery department of the Wheeling Mold & Foundry Co., of Wheeling, W. Va. This company has built much of the important machinery for the Panama Canal, and is contemplating manufacturing a complete line of road building machinery, including adjustable crushers, pulverizers, rolls, screens, elevators, trucks and graders. Mr. Kling has been connected for some time past with crusher companies in Cedar Rapids, Iowa.

CONTRACT NEWS

CONTRACTS PENDING

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9-2	Pittsburgh, Pa., st. imp.	8-31
9-2	Somerville, O., s'walks, curbs, &c.	8-31
9-2	Tumia, Miss., concrete sidewalks	8-31
9-2	Clarion, Ia., st. work	8-31
9-2	Birmingham, Ala., wood bl. pav.	8-31
9-3	Joliet, Ill., st. lpm.	8-31
9-3	St. Louis, Mo., grad., cement curbs, etc.	8-31
9-3	Aurora, Ind., road impt.	8-24
9-4	Fremont, O., paving, etc.	8-24
9-4	Decatur, Ind., macadam rd.	8-31
9-4	New York, N. Y., st. work	8-31
9-4	Reedsburg, Wis., sidewalk	8-31
9-5	Salt Lake City, U., cement sidewalks	8-31
9-6	Columbus O., grad. mac. rd.	8-31
9-6	Meridian, Miss., paving, etc.	8-24
9-7	Columbus, S. C., grad., draining mac. road	8-31
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9-9	Huntington, W. Va., grad., curb and paving	8-31
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9-2	Chatham, Va., 2 bridges	8-17
9-2	Huntingburg, Ind., 3 bridges	8-31
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9-3	St. Louis, Mo., bridge section	8-31
9-3	Vincennes, Ind., bridges (2)	8-24
9-3	Troy, O., wood blocks and concrete steel bridge	8-24
9-3	Stillwater, Okla., bridges	8-24
9-3	De Smet, S. D., reinf. concrete bridges	8-24
9-3	Concordia, Kan., 5 bridges	8-31
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9-4	Santa Ana, Cal., concrete bridge	8-31
9-5	Santa Barbara, Cal., con. bridge	8-31
9-5	Denver, Col., 2 reinf. con. bridges	8-31
9-5	Jackson, Miss., 3 bridges	8-31
9-5	Ord, Neb., bridge	8-24
9-6	Greensburg, Pa., repair bridge	8-31
9-6	Independence, Va., steel span	8-31
9-7	Hamilton, O., bridge	8-31
9-7	Hamilton, O., steel bridge	8-24
9-11	Cleveland, O., bridge work	8-31
9-12	Lancaster, O., steel sprst.	8-24
9-13	Cincinnati, O., concrete bridge	8-31
9-17	Toledo, O., bridge constn.	8-31
9-23	Wichita, Kan., reinf. con. bridge	8-31

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9-2	Delta, O., bonds	8-17
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9-3	Plainfield, N. J., street bonds	8-24
9-3	Middletown, O., bonds	8-24
9-9	Sunbury, O., bonds	8-31

ROADS AND STREETS

Bids Asked and Prospective Work.

Birmingham, Ala.—Bids will be received by the City Comrs. until Sept. 3 for paving with wood blocks, First Ave., from 18th St. to 21st St., and 20th St., between Morris and Fourth Ave. Estimated approximate cost, \$50,000. Address Walter G. Kirkpatrick, City Engr.

Bids for the paving of 20th St., between Railroad and Fourth Aves., will be opened by the Paving Comrs. at a meeting to be held Sept. 3.

Decatur, Ala.—The Comr's. Court of Morgan Co. will advertise for bids within the next few days for the construction of a part of the proposed new state highway through the county.

Arcadia, Cal.—H. A. Unruh, administrator of the Baldwin estate, will improve an extension to Huntington Drive, extending the drive through the Baldwin estate to a connection with Failing Leaf Ave., Monrovia. The extension will be the same width and construction as the Los Angeles Co. good roads system.

Bakersfield, Cal.—The Spvrs. have ordered the Kern Co. Surv. to make a preliminary survey for a road to the Ventura Co. line, where the work will be taken up by the officials of that county and extended to the coast.

Colton, Cal.—Bids will be received at once by the City Council of Colton for the improvement of certain streets, the approximate quantities as prepared by City Engr. Chas. H. Wordries, being 19,000 sq. yds. of sheet asphalt, 2,200 sq. yds. of cement curbs and gutters, 500 lin. ft. of corrugated iron culverts.

Eagle Rock, Cal.—Bids will be received soon by the Town Trustees for improving a portion of Valley Rd., a distance of approximately 3,900 lin. ft., grade, oil and tamp, cement gutters, some curbing, 18 reinforced concrete culverts at intersections, sidewalk along entire portion to be improved, tile drains. Plans and specifications may be seen at the office of the City Engr., Wm. F. Bixby, of Bixby & White, Mason building, Los Angeles.

Riverside, Cal.—Arrangements have been made for the repaving of Chicago Ave. for a distance of two and one half miles. The work will be done jointly by the city and county, a portion of the avenue being outside the city limits. Full macadam and oiled surface will be used.

San Francisco, Cal.—The Pub. Works Comrs. have authorized the performance of street work under private contract at the following locations: Curbing, paving, etc., 41st Ave. between Irving and Judan Sts.; grading, sewerage, etc., Eighth Ave. between Noriega and Ortega Sts.; curbing and paving Cañero St., between 42d and 43d Aves.; grading, sewerage, etc., Eighth Ave. between Noriega and Ortega Sts.; paving, etc., crossing of Geary St. and 10th Ave.; grading and paving, etc., 23d Ave. between Anza and Balboa Sts.; curbing and paving Midway St., between Francisco and Bay Sts.; grading 21st Ave. between Judan and Kirkman Sts.; curbing and paving, etc., crossing of 16th Ave. and Geary St.; curbing and paving unimproved portion of Doiores St. between 14th and 15th Sts.; sewerage, paving, etc., 16th Ave. between Balboa and Cañero Sts.; curbing, paving, etc., southerly half of Cañero St., between 43d and 44th Aves.

Santa Ana, Cal.—The Orange Co. Highway Comm. has filed a report with the supervisors recommending a bond issue in the amount of \$1,270,000 to build 107.22 miles of good roads, the width to be 16 ft. with provision for widening to 20 ft.

Santa Barbara, Cal.—The Chamber of Commerce has submitted a plan to the City Council for the improvement of over ten miles of the city streets.

Bloomington, Ill.—An ordinance for the construction of concrete sidewalk on both sides of Walnut St., from Main St. to the Illinois Central works was passed.

Aurora, Ill.—Ordinances were passed for the asphalt paving of Stolpa Ave. and of Union St. from Delius Ave. to Fourth Ave.

Joliet, Ill.—Sealed proposals will be received by the Bd. of Loc. Imps. until 10 a. m., Sept. 3, for the improvement of Glenwood Ave., in accordance with the specifications on file in the office of the City Engr. Wm S. Welch is Clk. of the Bd. of Loc. Imps.

Rantoul, Ill.—Civil Engr. G. C. Faircloth of Champaign, has been directed to install a storm water sewer here, to cost \$13,000.

Rock Island, Ill.—The Bd. of Loc. Imps. recommends to the City Comm. an ordinance for the paving of 47th St. with brick paving estimated to cost \$15,000. Address City Clerk.

Sterling, Ill.—Thirty-five thousand dollars will be expended paving many streets throughout the city. Address City Clerk.

Decatur, Ind.—The Co. Auditor has been ordered by the Bd. of Co. Comrs. to receive bids Sept. 4 for the construction of so-called Haugk macadam road in Fifth St., Decatur, extending from Heckman Mill to Adams St.

Hartford, Ind.—City Engr. Wm. Harley has completed plans and specifications for the improvement of West Water St. from Walnut St. to the Pennsylvania freight station. The City Engr. was ordered to make specifications for asphalt and blocks, sheet asphalt, creodon clicks and brick.

Cedar Rapids, Ia.—At a recent meeting of the City Comrs. it was decided to ask for bids for resurfacing of Second, Fourth and Fifth Aves., where the paving has gone to pieces.

Clarion, Ia.—Sealed proposals will be received by City Clk. F. W. Walker in his office in the First National Bank Bldg., until 4 p. m., Sept. 2, for the following street work: Grading Clark St., Lake St. and Main St., estimated quantities of material to be removed 853 cu. yds.; improv-

ing Lake St. by constructing brick block pavement 10½ in. thick, 1,785 cu. yds. Portland cement concrete paving, 6 ins. thick, 806 cu. yds. asphalt concrete paving, 7 ins. thick, 1,016 cu. yds. Bitulithic paving, 7 ins. thick, 1,016 cu. yds.; Main St., constructing brick block paving, 10½ ins. thick, 343 cu. yds. Portland cement concrete paving, 6 ins. thick, 181 cu. yds., asphaltic concrete paving, 7 ins. thick, 216 cu. yds., Bitulithic paving, 7 ins. thick, 216 cu. yds.; Clark St., constructing brick block paving, 10½ ins. thick, 995 cu. yds., Portland cement concrete paving, 6 ins. thick, 496 cu. yds., asphaltic concrete paving, 7 ins. thick, 596 cu. yds.

Proposals will be received at the same time and place for constructing curbing on all three of the above named streets.

Clear Lake, Ia.—A resolution to pave the central business streets was passed. Address City Clerk.

Des Moines, Ia.—The City Council has authorized the following paving improvements: Enos, 10th to 12th Sts., 12th, Enos to University, Ascension, Sixth to Fifth, and 31st St., between Forest and College Aves., with Bitulithic; 36th St., between Woodland and Pleasant Sts., Pleasant, between 36th and 35th to be paved with asphalt.

Ft. Dodge, Ia.—The City Council has passed a resolution of necessity ordering brick pavement for Central Ave., between First St. and the Illinois Central tracks.

Marshalltown, Ia.—The City Council has adopted a resolution levying the assessments for the paving of North Seventh St. from Main to Summit St., and West State St. from Sixth to Seventh St., according to the schedule of proposed assessments that had previously been prepared.

Anthony, Kan.—Sealed proposals will be received by E. R. Kirkpatrick, City Clk. of Anthony, until noon, Sept. 7, for the construction of curb and gutter on North and South Jennings and North Anthony Aves., according to specifications and plans on file in the office of the City Clk.

Baltimore, Md.—The Co. Comrs. have ordered concrete culverts to be erected on the following county roads: Hillside, Melvale, Third Dist., Parsonage, Spook, Eagle Mill, Sixth Dist., Mays, Belfast Pot Spring, Eighth Dist., Worthington, Tupton Church, Fourth Dist., Wise, Willow Spring, 12th Dist., Beckleysville, Trenton, Benson Mill, Fifth Dist.

The Paving Comm. has decided to pave Smallwood St. from Baltimore to Fayette Sts., and Monroe St. from Eagle St. to Monroe St. bridge with vitrified brick.

Niles, Mich.—A 9-ft. concrete roadway with 5-ft. gravel wings on each side is to be built on the mile of country roadway extending southwest of Niles over the Ballard hill on the Chicago Rd.

St. Paul, Minn.—The St. Paul Bd. of Pub. Works has voted to pave Rondo St. from Rice St. to Western Ave. with asphalt concrete.

Tunica, Miss.—Bids will be received Sept. 2 for the construction of 80,000 sq. ft. of concrete sidewalk. Address M. J. Alexander, Clerk.

Poplar Bluff, Mo.—The City Council has passed ordinances authorizing the paving with vitrified brick of eleven streets, or about twenty-eight blocks comprising the business section of the city.

St. Louis, Mo.—Bids will be received Sept. 3 for improving Alaska Ave. by grading and preparing the roadbed for the surfacing, furnishing granite curbing, and setting the same in Portland cement.

Batavia, N. Y.—Mayor Wiard and the Bd. of Education have voted to pave State St. north from Main St. this fall and to do a considerable amount of paving in the residential section next year.

Binghamton, N. Y.—Residents of Eldridge St. have petitioned for paving. Address City Engr. Giles.

New York, N. Y.—Sealed bids or estimates will be received by the President of the Boro. of Queens at his office in Boro. Hall, until 11 a. m. Aug. 31, 1912, for regulating, grading, curbing, flagging (where not already laid to grade and in good condition) and paving with improved granite blocks on a concrete foundation, and all work incidental thereto, in Seneca (Covert) Ave., from DeKaib Ave. to Putnam Ave., and from Cornelia St. to Myrtle Ave., Second Ward.

Sealed bids or estimates will be received by the President of Boro. of Brooklyn at his office in Boro. Hall, until 11 a. m.,

Sept. 4, 1912 for regulating and grading to a width of 7 1/2 ft. on each side of the centre line Sea View Ave. from Rockaway Ave. to a point about 400 ft. easterly. For regulating, grading, curbing and laying sidewalks on Wakeman Place, from First Ave. to Third Ave. For grading portion of lot on north side of 41st St., between Fifth and Sixth Aves., known as lot 51, block 917, section 3.

Athens, O.—An ordinance was passed determining to proceed with the improvement of Grosvenor St. from the south line of lot No. 2062 to the north line of lot No. 1509, by grading and paving.

Canton, O.—Ninety-eight hundred dollars in bonds have been voted to pay the city's portion of the cost of paving East Lake St. Address City Clerk.

Cincinnati, O.—Bids will be received Sept. 13 for improvements of the Clough Creek Pike, from the Batavia Pike to the Bogart Rd.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Sept. 6, 1912, for grading and paving with a waterbound macadam Sec. No. 2 the New Jasper Station Rd. State Highway 'G' Pet. No. 407 in Jasper Twp., Greene Co., length 1,800 ft., or 0.34 miles. Width of pavement, 12 ft. Estimated cost of construction, \$1,800.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Sept. 6, 1912, for grading and paving with gravel macadam the Dayton and Springfield Rd. State Highway 'G' Pet. No. 529 in Bath Twp., Greene Co., length, 10,663 ft., or 2.02 miles. Width of pavement, 14 ft. Estimated cost of construction, \$6,471.32. Alternative bids will also be considered for grading and paving the above road with slag, with a sulphite liquor surface treatment. Estimated cost of construction, \$7,406.54.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Sept. 6, 1912, for grading and paving with a waterbound macadam, the Warren Meadville Rd. State Highway 'C' Pet. No. 478, in Johnston Twp., Trumbull Co., length 18,500 ft., or 3.50 miles. Width of pavement, 10 ft. Estimated cost of construction, \$25,583.02. Alternative bids will also be considered for grading and paving the above road with bituminous surface treated concrete. Estimated cost of construction, \$25,518.53. Alternative bids will also be considered for grading and paving the above road with a macadam having a sulphite liquor treatment. Estimated cost of construction, \$28,613.19.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Sept. 6, 1912, for grading and paving with a waterbound gravel macadam, the Columbus Rd. State Highway 'H' Pet. No. 523 in Xenia Twp., Greene Co., length 14,588 ft., or 2.76 miles. Width of pavement, 14 ft. Estimated cost of construction, \$9,320.46. Alternative bids will also be considered for grading and paving the above road with a sulphite liquor treated gravel macadam. Estimated cost of construction, \$7,100.32.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Sept. 6, 1912, for grading and paving with bituminous surface treated concrete and brick pavement for medium traffic the Ashland and New London Rd. State Highway 'F' Pet. No. 339 in Ruggles Twp., Ashland Co., length, 13,265 ft., or 2.51 miles. Width of pavement, 14 ft. Estimated cost of construction, \$25,818.28.

Bids will be received for grading, draining, curbing and paving the roadway with asphalt or brick on Cole St. Address Paul B. Kemper, Clerk.

Delaware, O.—A resolution was passed declaring it necessary to improve Griswold St. from Franklin St. to Campbell St. by grading, underdraining, curbing and paving the roadway thereof with vitrified brick.

Lowellville, O.—Sealed bids will be received until Sept. 2 for the construction of sidewalks, crosswalks, curbs and gutters. C. W. Baker is City Clerk.

Newark, O.—A resolution was passed declaring it necessary to improve Elmwood Ave. from Log Pond Run to Shields St. by paving and curbing.

Roseville, O.—Five new streets will be paved in Roseville at a cost of \$10,000 according to a vote taken there recently which resulted in a majority of 162 in favor of spending the money.

Springfield, O.—An ordinance was passed to issue bonds in the sum of \$5,000

for the purpose of providing funds for purchasing or condemning the necessary land for the extension of Clairmont Ave., Thompson Ave. and Sumner St.

Toledo, O.—Resolutions have been passed by the City Council declaring it necessary to improve the following streets: Maplewood Ave., from Central Ave. to Castle Blvd., by grading and paving; Rogers St. from Navarre Ave. to Earl St., by grading and paving; Collins St. from Detroit Ave. to the Michigan Central Railroad by grading and paving; Islington St. from Collingwood Ave. to Lawrence Ave. by grading and paving; Lorain St. from Bway to the T., St. L. & W. R. R. by grading and paving.

Ordinances have been passed by the City Council determining to proceed with the improvement of the alley between Monroe and Bishop St., from Albion St. to Princeton Ave., by grading and paving; Avalon Pl. from Summit St. to Superior St. by grading and paving; Mulberry St. from Ontario St. to Champlain St. by grading and paving; Virginia St. from Collingwood Ave. to Lawrence St. by grading and paving; St. Claire St. from Monroe St. to Emerald Ave. by repaving.

Bartlesville, Okla.—More streets are to be paved in Bartlesville according to the statement of City Engr. Kirkpatrick.

Pittsburgh, Pa.—Sealed bids will be received at the office of the City Compt., at Municipal Hall, until 10 a. m., Sept. 2, for the following street improvements: Grading, curbing and paving with asphalt and brick, Alger St., from Winterburn St. to Lydia St.; grading, curbing and paving with brick and blockstone Melbourne St., between Greenfield Ave. and Frank St.; Nantasket St., from Greenfield Ave. to Neeb St.; Lydia St., from Greenfield Ave. to Neeb St.; grading, curbing and paving with brick, Frank St., from Greenfield Ave. to Lilac St.; Suburban Ave., between Fairplay St. and a point 615 ft. west of Brookside Ave.; Samantha Alley, between Stanton Ave. and Baywood St.; grading, curbing and paving with blockstone and asphalt, Hoosack St., from Ruppely Alley to Alger St.; grading, curbing and paving with blockstone Lilac St., between Graphic St. and Welfer's Lane; Winterburn St., from 150 ft. south of Farnsworth St. to Bigelow St.; grading and paving with brick Carmine alley from Sheridan St. to Thibe Alley, Holman Alley, from Cedarville St. to State Alley, repaving with blockstone Webster Ave., from Lawson St. to a point near Chauncey St., and from Perry St. to a point 65 ft. eastwardly; repaving with asphalt Warwick Terrace, from Devon Road to a point 152.64 ft. westwardly; repaving with brick Mansfield Ave., from Parkway to City Line; Adelaide St., from angle north of Camp St. to Milwaukee St.; cement sidewalks on Birmingham St., from the bridge over the P. V. & C. R. R. to Plus St.

Contracts aggregating about \$85,000 for the rebuilding of the Seventh and Thirtieth St. bridges across the Allegheny River, will soon be awarded by the Co. Cont. and Cmrs.

Columbus, S. C.—Bids will be received Sept. 7 for grading, draining and macadamizing a county road known as the Post Road, a total distance of 8 7/100 miles.

Greenville, S. C.—City Council, the Paving Commission and the residents along Pendleton St. have decided that sheet asphalt paving shall be laid on the above-mentioned thoroughfare.

Marshall, Tex.—Lake and Key, City paving engrs., are at work on the improvement districts outlined by the City Comm.

Salt Lake City, U.—Sealed proposals will be received until Sept. 5, for constructing cement sidewalks in sidewalk extension No. 161, both sides of Second South St., both sides of Tenth West St., and the west side of Ninth West St. N. Warrum is City Recorder.

Beaver Dam, Wis.—The city will construct 1 1/4 miles of paving next year. Address City Clerk.

LaCrosse, Wis.—Bids will be received Sept. 17 for furnishing all labor and materials necessary for improving streets with brick paving. Address James T. Day.

Reedsburg, Wis.—Bids will be received Sept. 4 for the construction of a sidewalk along the north side of lot 1 of block 3. Address City Clerk.

Huntington, W. Va.—Bids will be received Sept. 9 for grading, curbing and paving 7th Ave. and 4th St. Address A. B. Maupin, City Engr.

Bids Received and Contracts Awarded.

Sacramento, Cal.—The Clarke & Henry Const. Co., Stoll Bldg., has been awarded the contracts for paving and surfacing street railway right of way for the Pacific Gas & Electric Co. Amount, \$29,722.08.

San Diego, Cal.—The following bids were received for improving Arizona Ave., from University Ave. to Balboa Park: C. H. Tingley, 50c. per cu. yd. for excavation; 25c. per cu. yd. for embankment; \$75 for culverts; 11c. per sq. ft. for sidewalks; 37c. per lin. ft. for curbs. Olaf Nelson, 49c. for excavation; 7c. for embankment; \$79 for culverts; 77 1/2c. for sidewalks; 39c. for curbs. John Engbertson, 53c. for excavation; 2c. for embankment; \$69 for culverts; 12c. for sidewalks; 38c. for curbs. Knight & Hyde, 67 1/2c. for excavation; 2c. for embankment; \$100 for culverts; 11c. for sidewalks; 44 1/2c. for curbs.

Santa Barbara, Cal.—Jas. P. Donohue was awarded the contract for improving Hollister Ave., from Mission St. to the city limits, at \$4,905.50. The Santa Barbara Paving & Grading Co. bid \$5,977.

Venice, Cal.—G. Chiglieri, E. J. Overend and the Hudson-Johnson Const. Co., all of Oakland, have the contract for the grading of streets and the construction of curbs and sidewalks in a tract comprising twenty-three blocks at Venice. The land lies north of the Pacific Electric tracks, at Washington St., and extends to Ballona Creek. The contract price is 25c. per cu. yd. for excavation; 1c. per sq. ft. for oiling; 25c. per lin. ft. for 8-in. curb; 30c. per lin. ft. for 14-in. curbs, and 9c. per sq. ft. for sidewalks; total, \$50,000. C. J. Rhin, of Richmond, Cal., is the owner of the tract.

Boise, Id.—The low bid for the paving of two blocks in Fairview Ave. and the alley in block 42, was \$5,631.45 without guarantee and \$5,826.10 with guarantee, submitted by Maney Bros., of Boise.

Duquoin, Ill.—The contract for paving in Main St., from Line St. to Walnut St., and one block north and south of each intersecting street, has been awarded to Reeb Bros., at \$73,915.44.

Joliet, Ill.—The lowest bid for the construction of cement walks about the McKinley and Forest Park, Parks Ave. and Ridgewood schools, was \$1.54 per sq. ft., submitted by Newkirk & Powers.

Moline, Ill.—The contract for the paving of 7th St., between 12th and 19th Aves., with brick, has been awarded to the Western Improvement Co., of Racine, Wis., at \$37,625.00. The contract for paving 13th St., between 7th and 12th Aves., with brick has been awarded to I. D. Lain at \$4,800.

Urbana, Ill.—The contract for paving South Lincoln, Michigan and Orchard Sts., Urbana, has been awarded to J. W. Stipes of Champaign, at \$35,387.18.

Decatur, Ind.—The Co. Comrs. of Adams Co. have awarded the contract for building a macadam road in Freeble Twp. to Chris Musser at \$2,445. The contract for building the Conrad macadam road was awarded to Clay Engle at \$5,820.

Detroit, Mich.—The contract for boulevard paving has been awarded by the Park and Boulevard Comm. to Carpenter & Anderson, of Grand Rapids, at \$32,955. The material used will be asphalt concrete.

Duluth, Minn.—The contract for the improvement of Bardon Ave. road with trap rock has been awarded to P. Carroll at \$27,331.70. A. J. McDonald bid \$24,377.16, but neglected to submit a certified check or bond with the bid.

Red Lake Falls, Minn.—The contract for grading and paving with bituminous been awarded to Whitmore, Rauber & a small section of Edinburgh St., has 12 ft. wide, of the Leesville Rd., Sandusky Twp., Richland Co., to Carroll & treated water bound macadam, 2.04 miles, Gruber, Caledonia, O., at \$13,233.40. \$16,658.50.

Greenwood, Miss.—The contract for creosoted wood block paving was awarded to the Wood Block Co. of New Orleans at \$2.60 per sq. yd.

Macon, Miss.—The contract for the construction of 17.9 miles of macadam road has been awarded by the Bd. of Spvrs. to the Healy Constr. Co. of Meridian at \$59,611.

The contract for the construction of 22 1/2 miles of sand clay roads has been awarded to the Inland Constr. Co., Chandler, Okla., at \$25,887 for labor only.

Fulton, Mo.—The City Council has awarded the contract for paving two streets with brick to J. A. Stewart, of Columbia, Mo., at the following prices: Excavation, 40 cts. per cu. yd.; 6 by 18-in. concrete curb, 40 cts. per lin. ft.; brick on 5-in. concrete base, 2-in. sand cushion and asphalt filler, \$1.94 per sq. yd.

Glens Falls, N. Y.—The contract for paving Warren St., from Haskell Ave. to the Delaware & Hudson Crossing, and Lawrence St., from Ridge St. to the Delaware & Hudson Station with asphalt concrete has been awarded to Flood & Van Wert Co., of Hudson Falls, as follows: Warren St., \$15,658.50; Lawrence St., Vicinus at \$745.60.

Cincinnati, O.—The following contracts have been awarded for street work: Paving Lind St., between Hathaway and Bank with asphalt and wood block, Henkel & Sullivan, \$60,370.75; paving Moore St. with asphalt between Mary and Liberty Sts., Kirchner Constr. Co., at \$2,443; paving Clark St. with asphalt between Freeman and Dalton Sts., Wm. Scully, Jr., & Bros., at \$11,883.

Cincinnati, O.—The Co. Comrs. of Hamilton Co. have awarded the contract for resurfacing Cleves and Warsaw Pike, near the present end of Warsaw Pike westward, 18,000 ft. to Chas. Flynn, of Cincinnati, at his bid of \$5,880.

The contract for improving Symmes-town road, from Brecon to Sixteen Mile Stand, was awarded to W. Taulman at \$5,664.

Columbus, O.—The following contracts have been awarded for street work by the State Highway Comr.: Grading and paving with bituminated concrete, 2.14 the construction of a new bridge between section 31, Red Lake Falls Twp., and section 6, Lake Pleasant Twp., has been awarded to the Great Northern Bridge Co., of Minneapolis, at \$1,580.

Twp., Holmes Co., to W. R. Kniseley, New Philadelphia, O., at \$5,750; grading and paving with brick for medium traffic, 1.42 miles, 32 ft. wide, of the Belmont National Rd., Union Twp., Belmont Co., to Petrie & Turner, Logan, O., \$17,600; for miles of the Winchester Rd., in Madison Twp., Franklin Co., Chas. Bird, Springfield, O., \$21,000; for grading and paving with brick for medium traffic, 1.02 miles of the Portsmouth and Columbus Rd., in Clay Twp., Scioto Co., Henry H. Kaps, Portsmouth, O., \$12,537; grading and paving with bituminated concrete, 0.34 miles of the Millersburg and Berlin Rd., Hardy

Conshocton, O.—The contract for extending the Cambridge Road paving from the Corporation Line to the foot of Flint Hill, a distance of about one-half mile, the road to be built of concrete, was awarded to Henderson Bros. at \$5,102. Geo. J. Bock & Son were low bidders for brick construction at \$6,214.

Lisbon, O.—The contract for the grading and paving of the Salem and Winona road, from the corporation line of Salem and running a distance of one and a half miles to Winona, has been awarded to H. V. Baldwin of Corapolis at his bid of \$22,407.31.

Mansfield, O.—The contract for building two miles of Pike in Sandusky Twp. has been awarded to Carroll & Grubaugh, of Mansfield, at \$13,283.40. The road is to be waterbound macadam with tar surface.

Portsmouth, O.—The contract for grading Gallia Pike, from Young St. to the city limits, has been awarded to Seymour & Grimes at \$10,434. Monroe & Son bid \$13,780, and Kelley Bros., bid \$11,160.

Oregon City, Ore.—The contract for hard surfacing streets of the city has been awarded to the Montague-O'Reilly Co. at \$19,693.25.

Durant, Okla.—The contract for paving Third Ave., from Evergreen to Mulberry Sts., has been awarded to the Cleveland Trinidad Co., of Oklahoma City, at \$17,327.93. The work will consist of constructing asphalt concrete wearing surface on a Portland cement base.

Erie, Pa.—The contract for grading and paving Wayne St., from the south line of Eighth to Twelfth Sts., has been awarded to Mayer Bros., whose bid for California asphalt was \$1.14 and \$1.20 a cu. yd.

Palestine, Tex.—The contract for the building of 20 miles of sand clay roads in the Palestine Precinct has been awarded to Smith Bros., of Crockett, and Dan La Roe, of Palestine at approximately \$50,000.

Sherwood, Tex.—The contract for the concrete work in the construction of roads in the Sherman Precinct has been

awarded by the Larkin Const. Co., to C. H. Foley, of Sherman, at \$35,000.

Yakima, Wash.—The contract for constructing cement sidewalks on N. Third and N. Fourth Sts. and B C and D Sts., has been awarded to the Midland Engrg. Co., at \$4,533.55.

Milwaukee, Wis.—The following contracts have been awarded by the Bd. of Pub. Wks. for street work: Paving 22nd Ave., between Forest Home and Cleveland Aves., with macadam, D. M. Sneddon Co., at \$1.20 a sq. yd.; paving California St., from Idaho St. south, with bituminous macadam, to D. M. Sneddon Co., at \$1.20 per sq. yd.; paving Erie St., from the incinerator to Jefferson St., with stone block, to John M. Donahue, at \$3.32 per sq. yd.; paving the east one-half of Third St., from Cherry to Walnut St. and from Lloyd St. to North Ave., to Hase & Welcher, at \$2.84 per sq. yd.; resurfacing Wells St., between 11th and 24th Sts., to the Badger Const. Co., at \$1.43 per sq. yd.; resurfacing on Farwell Ave., between Brady St. and Lafayette Pl., and between Brady St. and Franklin Pl., to the White Const. Co., \$1.50 per sq. yd.

BRIDGES

Bids Asked and Prospective Work

Pottersville, Cal.—A new bridge over the Tule River, to cost between \$5,000 and \$6,000, will be erected to connect this city and Springville.

Santa Ana, Cal.—Bids will be received Sept. 4 by the Bd. of Spvs. for the construction of a concrete bridge across Soucal Canyon, Wash., according to plans and specifications on file in the office of the Bd. W. B. Williams, Orange, is Co. Clerk.

Santa Barbara, Cal.—City Engr. E. A. Garland has completed plans for a slab and beam concrete bridge with three 24-ft. spans, across the creek at State St. Bids will be called for Sept. 5. Plans for two bridges at the Boulevard and De La Guerra St. will be completed soon.

Denver, Col.—Sealed proposals will be received until Sept. 5 for the construction of either one or both of two reinforced concrete highway bridges and their necessary foundations across Cherry Creek at Market and Larimer Sts. Address S. B. Bradley.

Lafayette, Ga.—The County Commissioners of Walker Co. decided to build a bridge near Reece Jones' and one between J. J. Jones' and Duncan Bryan's. A petition for a bridge near E. P. Hall's was also presented.

Rome, Ga.—The present Bd. of Roads and Revenue of Floyd Co. will within the next four years build three concrete viaducts over the rivers in Rome, one in East Rome, one on South Broad St., and the third over the Oostanula on Fifth Ave.

Lewiston, Ill.—The Fulton Co. Bd. is planning to build bridges in Hart and Creek Twps. Address Co. Engr.

Crown Point, Ind.—The Lake Co. Bd. will construct a bridge over the Deep River in Hobart. Address Albert Foster, Pres. of the Bd.

Huntingsburg, Ind.—Sealed bids will be received up to Sept. 2, for the erection of three bridges, one 30-ft. bridge, one 40-ft. bridge, and one 24-ft. foot bridge, with concrete abutments and wings. J. H. Seng is Aud. Dubois Co.

Jeffersonville, Ind.—Plans and specifications for a new bridge at Stone's Ford, in Carr Twp., were filed in the office of Clark So. Auditor George V. Stoner, by Co. Surv. Paris W. Spurgeon. Bids will be called at once.

New Albany, Ind.—A culvert bridge on Silver St., between Market and Spring Sts., which broke down under the weight of an automobile truck, may be replaced with a concrete structure.

Concordia, Kan.—Bids will be received at the office of the Co. Clk. in the Court House at Concordia, until noon, Sept. 3, for the construction of five bridges in Cloud Co., as follows: French Bridge, pin connected steel truss, 80-ft. span, 16-ft. roadway, concrete floor, to be erected on stone piers already built. Bids will also be received for the same structure, but for steel stringers and wood block. Erickson Bridge, reinforced concrete superstructure, 20-ft. span, 18-ft. roadway. Plain concrete abutments and wing walls. Ramsey Bridge, riveted steel truss, 60-ft. span, 10-ft. roadway, with concrete floor, plain concrete abutments and wing

walls. Proctor Bridge, reinforced concrete superstructure, 24-ft. span, 16-ft. roadway, plain concrete abutments and wing walls. The French bridge is located near Jamestown, the Erickson Bridge near Glasco, the Ramsey Bridge near Concordia, the Proctor Bridge in Starr Twp. and the Neil Bridge in Starr Twp.

Eldorado, Kans.—Asst. State Eng. A. R. Losh will prepare plans for a concrete bridge in Butler Co., 100 ft. in length.

Manhattan, Kans.—Plans for 35 concrete bridges in Kansas are being drawn in the office of the state highway engineer at the Kansas agricultural college. Twenty-four of these are to be built in Jewell Co.

Wichita, Kans.—Seven bridges are to be built next fall in Sedgwick Co. For this purpose the Co. Comrs. at their meeting appropriated \$8,500 from the bridge fund, and directed the Co. Clerk to advertise for bids on the several jobs. Bids are to be in the hands of the clerk by Sept. 23.

Housatonic, Mass.—The Twn Board is preparing to build a concrete bridge at Park St. Address Town Clerk.

Northfield, Mich.—Northfield Twp. is to have two new bridges, one at Beck's Crossing, the other at the Stone Bridge.

Mankato, Minn.—Plans have been prepared for constructing 20 cement bridges in Jewell Co. Address Co. Aud.

Jackson, Miss.—Bids will be received Sept. 5 for the construction of a 24-ft. reinforced concrete bridge over Harris Creek in 5th Spvs.' Dist. Address W. W. Dowling, Clerk.

Sealed bids will be received Sept. 5 for the construction of the following steel and concrete bridges: New Town Bridge, Terry Bridge. George W. Sarlis is Engr.

St. Louis, Mo.—Bids will be received Sept. 3 for Letting No. 10707 for the fifth section of the municipal bridge, Letting No. 10708 for the sixth section of the municipal bridge. Address Maxime Reber, Pres. Bd. of Loc. Imps.

Lancaster, N. Y.—At a recent special town election, it was voted by a large majority to expend \$3,000 for the building of a new bridge over Cayuga Creek near Town Line.

Cincinnati, O.—The Hamilton Co. Comrs. have made arrangements to provide for replacing the Clark Rd. covered bridge which recently collapsed. The county surveyor will prepare plans for a concrete bridge at this point.

Bids will be received Sept. 13 for the construction of concrete bridge on Cincinnati and Dayton Dike, in Sharonville. Address Stanley Struble, Pres. Bd. of Loc. Imp.

Cleveland, O.—Sealed proposals will be received until Sept. 11, for the construction of bridge work, per report No. 2988, retaining wall on Lewis road, Olmsted Twp. John F. Goldenbogen, Cuyahoga Co. Clerk.

Hamilton, O.—Bids will be received Sept. 7 for the construction of sub and superstructure of bridge over the M. & E. Canal on High St. in the city of Hamilton. Parties bidding must submit complete detailed plans to conform to layout plan and general specifications now on file in the Butler Co. Auditor's office. Address W. W. Crawford, Co. Aud.

Toledo, O.—Bids will be received Sept. 17 for labor and materials required for the superstructure and backwalls for bridge on Lucas Co. road No. 529 over Ten Mile Creek. Res. No. 501 Culvert, Res. No. 539 abutments, Res. No. 550 superstructure, Res. No. 550 concrete abutments to bridge on Monroe St. Address Chas. J. Sanzenbacher.

Easton, Pa.—The Northampton Co. Comrs. instructed the county engineer to advertise for bids for rebuilding Co. bridge No. 32, over Oughoughton Creek, in Lower Mt. Bethel Twp.

Greensburg, Pa.—Sealed bids will be received at the office of the Westmoreland Co. Compt. until noon, Sept. 6, for the repair of the county bridge at Murrysburg, over Turtle Creek on the road leading from Murrysburg to Harrison City. The work consists of the construction of two rubble masonry abutments, the placing of a 250-ft. span steel highway bridge on the same and constructing approaches thereto. Address John S. Sell, Co. Compt.

Pittsburgh, Pa.—Sealed bids will be received by the City Comptroller at his office in Municipal Hall, until 10 a. m., Sept. 2, for the construction of a reinforced concrete bridge on the line of Murray Ave. over William Pitt Blvd., and for the re-flooring of the roadway and repairing the sidewalks of the 28th St. bridge over the P. R. R. and constructing concrete retaining walls on the Larimer Ave. bridge over Washington Blvd.

Independence, Va.—Sealed bids will be received by P. St. Julien Wilson, State Highway Comr. of Virginia, at the office of the Clerk of the Circuit Court of Grayson Co. at Independence, until noon, Sept. 6, for the construction of a bridge over Elk Creek. Approximate length of structure, 87.6 ft., with a 12-ft. roadway; character of superstructure, one 87-ft., 6-in. steel span; character of substructure, concrete. Plans and specifications may be seen at the office of the Clerk of the Circuit Court, Grayson Co., Independence, or at the office of the State Highway Comr., Richmond.

Lebanon, Va.—Sealed bids will be received until noon, Sept. 2, by the State Highway Comr., at the office of the clerk of Russell Co., at Lebanon, for the construction of a bridge over Cooper Creek, near Castlewood. Approximate length of structure, 61.3 ft., with 12-ft. roadway. Character of superstructure, steel, with wood floor; character of substructure in place. Plans and specifications may be

seen at the office of the clerk in Lebanon, Va., or at the office of the State Highway Comr.

Seattle, Wash.—It is stated to be probable that more than a half million dollars will be expended by the city in the reconstruction of bridges spanning the Lake Washington canal.

Milwaukee, Wis.—The Milwaukee Co. Bd. Comm. on highways, bridges, and railroads decided to recommend to the County board the building of a concrete bridge on Port Washington Road.

Bids Received and Contracts Awarded.

Seattle, Ala.—The contract for the construction of a 90-ft. concrete arch bridge over the Little Uchee Creek has been awarded to J. Gray Hanlon of Birmingham at \$5,460.

Oroville, Cal.—The contract for the construction of a steel and concrete bridge in this city has been awarded to the Chico Const. Co. of Chico at \$12,894.

Reading, Pa.—The contract for replanking part of the Schuylkill Ave. bridge in the city of Reading, has been awarded by the Co. Comrs. of Berks Co. to Amos K. Bieber, at \$113. The contract for furnishing lumber for the bridge crossing the Swatara Creek, in Bethel Twp. has been awarded to Elias Strause of Millersburg, at \$32 per thousand ft.

The contract for repairing the Scharff's bridge in Marion Twp. has been awarded to the Redding Contr. Co. at \$400.

Davenport, Wash.—The contract for the construction of a 75-ft. steel span bridge across Crab Creek near Edwall, a 60-ft. steel span bridge across Fishtrap Creek near Sprague, and a 60-ft. steel span bridge across Cole Creek near Mohler, has been awarded to the Coast Bridge Co. of Portland, Ore., at \$6,100.

Milwaukee, Wis.—The Dept. of Pub. Wks. has awarded the contract for constructing a concrete bridge over the Kinnickinnic River on 8th St. to Czaerpate Const. Co. at \$2,800.

NOTICE TO CONTRACTORS

STATE OF NEW YORK

Office of the State Commission of Highways, Albany, N. Y.

Pursuant to the provisions of Chapter 20, Laws of 1909, and Chapter 646, Laws of 1911, sealed proposals will be received by the undersigned at their office, No. 55 Lancaster St., Albany, N. Y., at one o'clock P. M. on Monday the 9th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County	Road No.	Name.	Approx. Length.
Allegany	5312	Cuba-Friendship, Pt. 2	6.10	Onondaga	5365	Syracuse-Lafayette	7.00
Broome	5339	Binghamton City; Court St.	1.05	Orange	5328	West Point-Central Valley	11.20
Broome	1106	Harpersville-Ouaquaga	5.10	Oswego	5250	Central Sq.-Union Sq., Pt. 1	7.00
Chautauqua	5217	Jamestown-Bemus Point	7.96	Rensselaer	5354	Raymstown-Hoosick, Pt. 2	5.11
Chautauqua	5263	Dewittville-Mayville	5.51	Steuben	5342	Cemetery Hill; Hornell	0.61
Clinton	5197	Plattsburg City	1.79	Steuben	5349	Painted Post-Addison, Pt. 3	4.98
Clinton	5228	Rouses Point Village	2.24	Steuben	5351	Avoca Village	1.50
Columbia	5347	Hillsdale-Copake Iron Works	4.85	Steuben	5353	Hornell City; Canisteo St.	0.24
Delaware	5343	Grand Gorge-Stamford	12.14	Schuyler & Yates	5334	Watkins-Yates County Line	7.57
Delaware	5383	East Branch-Trout Brook	2.27	Suffolk	5301	Bayshore-Brookhaven	12.92
Delaware	5384	Margaretville-Halcottsville	6.23	Tompkins	5379	Ithaca-West Danby, Pt. 1	3.22
Dutchess	5326	Dover Plains-Pawling Town Line, Pt. 2	3.93	Washington	5316	Cambridge-Salem, Pt. 3	3.09
Greene	5367	Catskill-Athens	5.97	Westchester	5321	White Plains-Rye	1.64
Greene	5369	Coxsackie Village	2.31	Westchester	5357	Bronxville Village	0.95
Jefferson-Lewis	5332	Lowville-Carthage	11.33	Westchester	5358	Mt. Vernon City; Columbus Av.	0.28
Lewis	5327	Oneida County Line-Turin	14.77	Westchester	5359	Yonkers City; Central Park Av.	6.48
Madison	5329	Cazanovia-Morrisville	10.11	Westchester	5360	East View-Briarcliff Manor	5.04
Niagara	5319	Wrights Corners-Hartland	6.64	Westchester	5361	Briarcliff Manor Village	0.83
Niagara	5381	La Salle Bridge	0.09	Westchester	5362	Tuckahoe Village	0.25
Oneida	5346	Remsen-Boonville Town Line	6.12	Westchester	5363	Peekskill Village	2.27
Oneida	5325	Whitesboro-Trenton	12.37	Westchester	5364	Ossining-Croton River	1.66
				Yates	5324	Dundee-Penn Yan	10.89

Sealed proposals will also be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at one o'clock P. M. on Tuesday the 10th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County.	Road No.	Name.	Approx. Length.
Albany	1105	Albany City; Central Ave.	0.75	Oswego	5382	Fulton-Oswego	12.00
Allegany	5341	Friendship-Belmont	6.80	Saratoga	5313	Stillwater Village	1.30
Broome	5377	Riverside Drive-Binghamton	1.91	Schoharie	5286	Howes Cave-Cobleskill	4.76
Broome	5338	Windsor-Deposit	13.84	Schuyler	5335	Watkins Village; Franklin St.	1.75
Chemung	1095	Elmira City; So. Broadway	1.12	St. Lawrence	5331	Gouverneur Village	1.78
Cattaraugus	5259	Salamanca-Little Valley, Pt. 2	6.86	Steuben	5348	Canisteo-Jasper	12.82
Chautauqua	5245	Bemus Point-Dewittville	5.97	Steuben	5352	Arkport-Dansville	10.38
Chautauqua	5320	Westfield Village	1.07	Suffolk	5232	Smithtown-Port Jefferson	11.25
Clinton	5199	Chazy-Rouses Point	8.25	Sullivan	5322	Monticello-Liberty, Pt. 2	3.45
Clinton	5337	Rouses Point-Canadian Line	2.36	Tioga	5333	Waverly Village	1.28
Delaware	5340	Colchester-Sullivan County Line	8.00	Washington	5336	Salem-Granville, Pt. 2	9.48
Greene	5366	Catskill Village	1.97	Washington	1082	Cambridge Village	1.71
Greene	5368	Athens-Coxsackie	4.06	Westchester	5371	Larchmont Village	0.95
Greene	5370	Coxsackie-Ravenna, Pt. 2	2.70	Westchester	5372	New Rochelle-Mamaroneck	0.73
Jefferson	5344	Carthage Village	2.12	Westchester	5373	Rye Village	2.85
Madison	5330	Morrisville-Bouckville	5.63	Westchester	5374	Pelham-New Rochelle	0.20
Madison	5340	Bouckville-Madison	2.45	Westchester	5375	Pelham Manor Village	1.34
Onondaga	5318	Camillus-Fairmount, Pt. 2	1.20	Westchester	5376	Mamaroneck Village	1.29
Oneida	5345	Trenton-Remsen	5.49	Westchester	(3)5355	Tuckahoe-White Plains, Pt. 1	2.43
Ontario-Yates	5323	Penn Yan-Halls Corners	8.15	Westchester	5356	White Plains Village	2.02
Orleans	5315	Medina Village	2.45	Wayne	5378	Ontario-Center-Williamson	4.50

After August 26, 1912, maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of Division Engineer Spencer J. Stewart, Realty Building, White Plains, N. Y., for highways in the counties of Dutchess, Orange, Suffolk, Sullivan and Westchester; at the home of Division Engineer Paul McLeod, Humane Building, Albany, N. Y., for highways in the counties of Albany, Clinton, Columbia, Greene, Rensselaer, Saratoga, Schoharie and Washington; also at the office of Division Engineer James H. Sturtevant, Cleveland Building, Watertown, N. Y., for highways in the counties of Jefferson, Lewis, Oneida and St. Lawrence; also at the office of Division Engineer Frederick Steel Strong, 433 South Salina Street, Syracuse, N. Y., for highways in the counties of Madison, Onondaga, Ontario, Oswego, Wayne and Yates; also at the office of Division Engineer James P. Morrissey, 423 Cutler Building, Rochester, N. Y., for highways in the counties of Allegany, Cattaraugus, Chautauqua, Niagara and Orleans; and also at the office of Division Engineer Perry Filkin, 901 Press Building, Binghamton, N. Y., for highways in the counties of Broome, Chemung, Delaware, Schuyler, Steuben, Tioga and Tompkins.

The special attention of bidders is called to "Information for Proposers" on pages 1 to 10 inclusive, of the specifications.

Proposals for each highway must be presented in a separate sealed envelope endorsed on the outside with the name and number of the highway for which the proposal is made.

Each proposal must be accompanied by a New York draft or certified check payable to the order of the State Commission of Highways for an amount equal to at least five per cent. of the amount of the proposal which such draft or check accompanies. This draft or check will be held by the Commission until the contract and bond are duly executed.

The successful bidder will be required to give a bond for fifty per cent. of the amount of the contract; such bond to be executed by a Surety Company to be approved by the Commission, or a bond secured by the deposit of collateral securities to be approved by the Commission.

The right is reserved to reject any or all bids.

C. GORDON REEL,
Superintendent of Highways.
JOHN A. BENNEL,
State Engineer.
DUNCAN W. PECK,
Superintendent of Public Works.

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Experimental Work on Park Heights Avenue

A Summary of Results Obtained by the Penetration Method Near Baltimore, Md.

By Maj. W. W. CROSBY, M. Am. Soc. C. E.*

Park Heights Avenue, adjacent to Baltimore, Maryland, is the site of one of the most comprehensive of all experiments with the "penetration method" of constructing "pitch macadam." A summary of the work, of the expenses met in it, and of the results obtained may be, the writer feels, of interest and profit to highway engineers generally, and he therefore submits the following statements:

The work proper covers a stretch of a little over $6\frac{1}{2}$ miles (33,515 ft.) of main road beginning at the limits of Baltimore City and running northerly into Baltimore County. The first $3\frac{1}{4}$ miles have a metaled surface of trap rock, 24 ft. wide, on the easterly side of which is

an electric railway track, while along the westerly side is a 12-ft. earth roadway (see Figure 1). The next $\frac{2}{3}$ mile has the same kind and width of metal, but the earth roadway takes the place of the tracks on the easterly side and the shoulder on the westerly side becomes 5 ft. in width. For the balance of the distance (about $2\frac{1}{2}$ miles) the avenue has metal but 14 ft. wide (of hard, blue limestone) with an earth shoulder 5 ft. in width on each side.

The $\frac{2}{3}$ mile just referred to is really of water bound macadam, surface treated with pitch, and was not constructed by the penetration method. However, because of the circumstances, and of its interest in this connection, the writer takes the liberty of including it here.

The longitudinal grade of the first 4 miles is moderate, in but one case (Section 7, see Table A, where it

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FIGURE 1.—GENERAL VIEW ON PARK HEIGHTS AVENUE NEAR BALTIMORE, MD. SHOWING CONDITION OF ROAD IN JULY, 1912.

TABLE A. (Concluded on opposite page).

Sect.	Material.	Survey stations		Lin. Width		Locations		Square Yds.
		From.	To.	Ft.	Ft.	Street.	Station.	
1	Texas			320	30	Wiley Av.	0	
				55	35			
		0-350	37+50	3,715	24	Belvidere Av.	37+50	11,226.11
2	Gulf Ref. Co., "Asphaltoid A"	37+50	44+76	726	24			1,936
3	Texas	44+76	49+42	466	24	Hayward Av.	46+	1,242.66
4	Imp. Prod. Co., "Fairfield"	49+42	53+82	440	24			1,173.33
5	U. G. I., "No. 4, Sample No. 1"	53+82	60+24	642	24			1,712
6	Warren Puritan Brand No. 10	60+24	67+09	685	24	Rogers Av.	60+75	1,826.66
7	"Tarvia X"	67+09	74+25	716	24			1,909.33
8	Amer. Tar Co., "Tarite"	74+25	81+06	681	24	Glen Av.	81+	1,816
9	U. G. I., (1909 work)	81+06	85+45	439	24			1,170.66
10	U. G. I., (1910 work)	85+45	97+57	1,212	24	Taney Rd.	96+	3,232
11	Texas	97+57	120+00	2,243	24			5,981.33
11A	Mixed, 52 Barrels	120+00	124+73	473	24	Clark's lane.	121+	1,261.33
12	Headley Manf. Co.	124+73	142+30	1,757	24	Belmont Av.	138+	4,685.33
13	Barber Asphalt Co.	142+30	158+06	1,576	24	Seven Mi. L.	150+	4,202.66
14	"Fairfield"	158+06	170+00	1,194	24	Slade Av.	170+	3,184
15	"Fairfield-Antidust"	170+00	199+04	2,904	18	Opposite Suburb. Club	180+	5,808
16	U. G. I., "Antidust"	199+04	204+54	550	18	Court Rd.	204+	1,100
17	"Sarco"	204+54	231+30	2,676	12	S of Barracks	231+	3,568
18	Standard Oil (1910 work)	231+30	245+50	1,420	12	Barracks.	about 240+	1,893.33
19	Standard Oil (1909 work)	245+50	245+32	82	14			127.55
20	U. G. I.	245+32	254+64	832	14			1,294.22
21	Texas	254+64	259+10	446	14	Hooks lane.	259+	693.77
22	Gulf "Asphaltoid A"	259+10	265+38	628	14			976.88
23	Warren Puritan Brand No. 17	265+38	270+81	543	14	Ice Pond	271+	844.66
24	U. G. I.	270+81	285+25	1,444	14	Stone Arch Culvert.	285+90	2,246.22
25	Imp. Prod. Co., "Fairfield"	285+25	295+10	985	14	B. Keyser's Entrance.	294	1,532.22
26	Con. G. E. L. & P. Co., complete top of U. G. I.	295+10	319+26	2,416	14	R. R. Bridge	305+25	3,758.22
27	Con. G. E. L. & P. Co.	319+26	326+00	674	14	Ss Valley Rd	326+0	1,048.44
28	"Texaco Special"	326+00	331+65	555	14	Ns Valley Rd	326+10	863.33
29	"Glutrin"	331+65	432+14	100	12	Caves Rd.	432+14	13,398.67

Length 8.246 + miles.

¹Pitch gratis. ²Reconstructed, 1911. ³Reconstructed 1911, 21.3 sq. yds. ⁴Reconstructed, 1911. ⁵Hauling and spreading .0025 per sq. yd. macadam. ⁶Rolling in No. 2 stone and chipping.

reaches a maximum of 2½ per cent. for 200 ft.) exceeding 2 per cent. And the same is true of the balance of the avenue except for Sections 20, 21, 22 and 23, where the maximum is as high as 5 per cent.

It should probably be stated also that while the pitch

macadam work on the avenue covers but 6½ miles, the avenue itself extends many miles beyond into the country, and is a main thoroughfare for all kinds of traffic to and from the city. The inner end of the avenue is thickly lined with residences and shops, while the outer



FIGURE II.—NEAR VIEW ON SECTION 13—SHOWING TWO-COAT WORK IN FOREGROUND AND BACKGROUND WITH ONE-COAT WORK IN THE MIDDLE-GROUND.

TABLE A (Concluded from opposite page).

Sect.	Dates of Use.	Gallons Used.	Construction of Macadam per Sq. Yd.				Maintenance of sq. yd. macadam. 1911					Maintenance Per Sq. Yd. of Macadam: Jan. 1 to May 31, 1912.			
			Cost			1910									
			Resurfacing	Pitching including chipping,	Total first cost.		Earthwork and culverts.	Painting edges	Oiling and chipping.	Repairs Net	Totals.	Earthwork and culverts.	Painting edges.	Net repairs.	Totals.
1.....	July-Aug., '09	2.39	0.337	0.327	0.664	0.088				.9011	.9011	.0136		.0010	.0146
2.....	Aug.-Sept., '09	3.97	.339	.434	.773	.080	.0455			.0000	.0455	.0130		.0070	.0200
3.....	Sept., '09	3.22	.336	.418	.754	.187				.9947	.9947	.0105		.0010	.0115
4.....	Sept., '09	3.67	.337	.449	.786	.081	.0093			.0000	.0093	.0045		.0012	.0057
5.....	Sept., '09	3.12	.339	.344	.683	.081	.0049		.0364	.0093	.0506	.0034		.0009	.0043
6.....	Sept.-Oct., '09	4.19	.333	.606	.939	.079	.0024			.0563	.0587	.0069		.0008	.0077
7.....	Oct., '09	5.40	.337	.618	.955	.082	.0054		.0180	.0034	.0268	.0039		.0119	.0158
8.....	Oct., '09	4.41	.336	.605	.941	.080	.0097			.0098	.0195	.0039		.0030	.0069
9.....	Nov., '09	4.46	.340	.454	.894	.091	.0187			.0049	.0236	.0076		.0012	.0088
10.....	May-June, '10	1.43	.397	.242	.639		.0097			.0223	.0320	.0018		.0005	.0023
11.....	June, '10	1.25	.397	.264	.661		.0028			.0042	.0070	.0013		.0015	.0028
11A.....	June, '10	1.65	.397	.262	.659		.0055			.0298	.0353	.0000		.0000	.0000
12.....	June-July, '10	1.70	.397	.327	.724		.0029			.0349	.0378	.0008		.0003	.0011
13.....	July-Aug., '10	1.45	.397	.325	.722		.0057	.0101		.0000	.0158	.0009		.0003	.0012
14.....	Aug.-Sept., '10	1.69	.397	.292	.689		.0048	.0013		.0130	.0191	.0013		.0088	.0101
15.....	Oct., '10	0.61	.397	.084	.481		.0037			.0335	.0372	.0007		.0049	.0056
16.....	Sept.-Oct., '10	0.94	.397	.140	.537		.0070			.0980	.1050	.0000		.0120	.0120
17.....	Oct., '10	1.42	.397	.325	.722		.0136	.0161		.0000	.0297	.0118	.0050	.0000	.0168
18.....	Oct., '10	1.70	.397	.287	.684		.0091	.0281	.0062	.0000	.0434	.0008		.0000	.0008
19.....	Nov., '09	3.92	.241	.174	.415	.087	.0266		.0484	.2179	.2929	.0000		.0072	.0072
20.....	Oct., '09	3.86	.230	.408	.638	.088	.0683		.0332	.0513	.1528	.0168		.0000	.0168
21.....	Oct., '09	4.70	.228	.551	.779	.088	.0186			.1805	.1991	.0048		.0059	.0107
22.....	Oct., '09	2.95	.229	.405	.634	.082	.0391			.1851	.2242	.0000		.0000	.0000
23.....	Oct., '09	4.71	.224	.691	.915	.082	.0144		.0293	.0463	.0900	.0000		.0000	.0000
24.....	Sept., '09	2.23	.229	.257	.486	.081	.0114		.0041	.0514	.0669	.0000		.0079	.0079
25.....	Sept., '09	2.73	.228	.353	.581	.057	.0091			.0763	.0854	.0014		.0000	.0014
26.....	Aug., '09	2.98	.216	.303	.519	.057	.0038			.0286	.0324	.0049		.0000	.0049
27.....	Aug., '09	1.95	.216	.227	.436	.057	.0086	.0053		.0003	.0142	.0045		.0000	.0045
28.....	Oct.-Nov., '10	1.25	.607	.355	.962		.0107	.0068		.0024	.0199	.0059		.0211	.0270
29.....	Nov., '09														
29.....	Oct.-Nov., '10	0.45	.318	.074	.392		.0138			.0308	.0446	.0126		.0178	.0304

chips. *Includes construction of apron, 46.19 or .0143 per sq. yd. macadam. †Includes pitching apron at Slade Ave., \$7.83 or

end passes through a section of country places and farms. For 2 miles beyond the pitch section the avenue is well macadamized and has been maintained with treatments of Glutrin and water. Beyond this, however, the avenue is only an ordinary American country road through a wooded

or purely farming section. Numerous cross or branch roads intersect the avenue along its length.

The traffic conditions over the various sections of the avenue are probably best expressed by the table of traffic censuses accompanying (see Table B).



FIGURE III.—NEAR VIEW OF ROADWAY ON SECTION 13, SHOWING ONE-COAT WORK IN FOREGROUND—TAKEN FACING OPPOSITE DIRECTION TO FIGURE II.

TABLE B.—TRAFFIC ON PARK HEIGHTS AVENUE, BALTIMORE COUNTY, MARYLAND.

Classification.		SECTION 1.						
		Units on Dates Named Per Period of Ten Hours.						
		Nov. 14'10	Nov. 17'10	Oct. 19'11	May 4'12	May 10'12	May 11'12	
One Horse Vehicles.	2	376	442	438	566	608	514	
Two "	4	364	332	408	456	560	468	
Three "	6	48	48	...	30	60	48	
Four "	8	104	72	16	...	16	...	
Six "	12	24	...	12	...	...	...	
Total Horse Traffic	..	916	894	874	1,052	1,244	1,030	
Motor Traffic:								
Motorcycles	2	14	14	50	102	96	136	
Runabouts	10	200	230	480	590	450	830	
4 or 5 Seat Cars	20	2,100	2,580	6,580	11,960	11,660	18,800	
7 Seat Cars	40	1,920	2,480	5,320	9,920	5,120	9,760	
Omnibuses or Drays	20	40	80	440	700	760	980	
Total Traffic	..	5,190	6,278	13,744	24,324	19,330	41,536	
		clear	clear	clear	clear	clear	clear	
				rain P. M.				

Classification.		SECTION 2.						
		Units on Dates Named Per Period of Ten Hours.						
		Nov. 15'10	Nov. 18'10	Oct. 14'11	Oct. 21'11	May 10'12	May 11'12	
One Horse Vehicles.	2	336	314	422	314	632	636	
Two "	4	356	312	376	248	512	476	
Three "	6	18	18	...	...	30	90	
Four "	8	152	96	16	8	16	...	
Six "	12	...	24	...	...	...	...	
Total Horse Traffic	..	862	764	814	570	1,190	1,202	
Motor Traffic:								
Motorcycles	2	6	8	80	...	80	136	
Runabouts	10	130	120	550	370	640	840	
4 or 5 Seat Cars	20	2,200	2,500	8,080	5,120	9,300	15,440	
7 Seat Cars	40	1,520	2,120	5,280	5,320	9,880	11,400	
Omnibuses or Drays	20	120	120	640	540	840	1,060	
Total Traffic	..	4,838	5,632	15,444	11,920	21,930	30,078	
		cloudy	clear	clear	rain	clear	clear	

Classification.		SECTIONS 15 AND 16.				
		Nov. 16'10	Nov. 19'10	Nov. 21'10	Nov. 25'10	Apr. 12'12
One Horse Vehicles	2	78	94	56	46	40
Two "	4	100	52	52	76	36
Three "	6	20	12	12	18	...
Four "	8	40	8	...	...	...
Six "	12	12	...	12	12	...
Total Horse Traffic	..	250	166	140	152	76
Motor Traffic:						
Motorcycles	2	8	14	...	6	34
Runabouts	10	80	100	40	50	180
4 or 5 Seat Cars	20	1,440	1,680	1,260	1,050	2,360
7 Seat Cars	40	1,080	1,520	1,440	1,200	760
Omnibuses or Drays	20	40	60	60	60	220
Total Traffic	..	2,898	3,540	2,946	2,528	3,630
		clear	clear	cloudy	clear	clear

Classification.		SECTIONS 17 TO 21.				
		Nov. 22'10	Nov. 26'10	Oct. 25'11	Apr. 1'12	Apr. 16'12
One Horse Vehicle.	2	44	40	44	444	176
Two "	4	44	28	24	748	372
Three "	6	...	...	6	...	...
Four "	8	...	8	8	272	152
Six "	12	36	24	...	336	120
Total Horse Traffic	..	124	100	82	1,800	820
Motor Traffic:						
Motorcycles	2	...	8	16	80	26
Runabouts	10	40	20	230	680	440
4 or 5 Seat Cars	20	560	760	960	4,960	3,120
7 Seat Cars	40	480	760	2,680	2,400	1,160
Omnibuses or Drays	20	60	40	60	1,060	420
Total Traffic	..	1,268	1,688	4,028	10,980	5,986
		rain		clear	cloudy	clear

Classification.		SECTION 27.	
		Nov. 23'10	Nov. 28'10
One Horse Vehicles	2	68	70
Two "	4	20	40
Three "	6	...	...
Four "	8	40	16
Six "	12	216	96
Total Horse Traffic	..	344	222
Motor Traffic:			
Motorcycles	2	6	4
Runabouts	10	30	10
4 or 5 Seat Cars	20	1,000	320
7 Seat Cars	40	1,480	520
Omnibuses or Drays	20	60	40
Total Traffic	..	2,920	1,116
		fair	cloudy rain

Classification.		SECTION 28.		
		Jan. 16'11	Apr. 10'12	May 29'12
One Horse Vehicles	2	28	28	28
Two "	4	4	8	12
Three "	6	...	...	...
Four "	8	40	24	9
Six "	12	132	96	1
Total Horse Traffic	..	204	156	50
Motor Traffic:				
Motorcycles	2	...	6	...
Runabouts	10	...	30	1
4 or 5 Seat Cars	20	...	160	19
7 Seat Cars	40	...	...	5
Omnibuses or Drays	20	...	40	5
Total Traffic	..	204	392	80
		clear cold	clear	clear

Classification.		SECTION 29.	
		Nov. 24'10	Nov. 29'10
One Horse Vehicles	2	26	22
Two "	4	16	12
Three "	6	...	...
Four "	8	24	8
Six "	12	96	...
Total Horse Traffic	..	162	42
Motor Traffic:			
Motorcycles	2	...	...
Runabouts	10	10	20
4 or 5 Seat Cars	20	120	120
7 Seat Cars	40	80	80
Omnibuses or Drays	20	...	...
Total Traffic	..	372	262
		fair	cloudy

*See "A Simplification of Traffic Records for Purposes of Comparison." The Surveyor, March 10, 1911.

The work of resurfacing the old road was begun by the writer in July, 1909, simultaneously at the city limits and at the outer end of the 6-mile section, the crews working toward the center and generally proceeding as follows:

The old macadam surface was scarified, reshaped and strengthened as a foundation, where necessary, by the removal of the mud or worn-out material and its replacement with fresh, broken stone. It was then well rolled to form a firm first course. On this was spread, so as to give a crown of $\frac{1}{2}$ in. per ft., a layer averaging about 4 ins. thick (loose) of clean, crushed stone varying in size from 1 in. to 2 ins. This layer was then unusually well rolled. When the utmost possible compaction ap-

peared to have been secured, the pitch treatment (except on Sections Nos. 15 and 16) was begun and carried on as follows:

The pitch was heated until it flowed freely and then applied (by gravity alone) to the surface of the stone. Every effort was made to secure as even a distribution as possible. A coating of clean stone chips (passing a 1-in., and remaining on a $\frac{1}{4}$ -in., screen) was then spread over the pitched road in sufficient quantity to take up any excess of pitch apparent on the surface and to fill the voids. The road was then again rolled and opened to traffic.

Slight variations from the above general description were made in some instances by "reversing" the courses of the macadam and using the coarser stone for the top layer. In some of the latter cases also, before the pitch was applied to the stone (which was in all cases first thoroughly rolled), a layer of sand, to partly fill the voids, was put on and rolled in. But in most cases the pitch was applied to the clean, rolled second course and generally the work proceeded according to the above brief description.

As will be seen by the table (A) the quantities of pitch used varied greatly under different circumstances, as did also the quantity of chips used, per square yard.

TABLE C. TABLE SHOWING ANALYSIS OF BITUMINOUS MATERIALS USED ON PARK HEIGHTS AVENUE.

Analysis.	Name of Material.														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Water soluble material.....	(4)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Free carbon insoluble in CS ₂	1.375	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Insoluble in carbon tetrachloride.....	15.625	.23	175.	4.91	.066	25.69	24.19	28.59	1.3	4.83	.16	1.92	1.74	4.56	1.05
Ash.....	(1) 2	Trace	Trace	8.14	.05	27.	.08	Trace	Trace	Trace	Trace	.63	1.49	10.96	.04
Fixed carbon less free carbon.....	7.55	4.3	6.495	5.3	25.55	9.04	8.43	6.39	21.67	23.16	9.73	9.74	12.64	5.92	10.91
Specific gravity.....	.9534375	.97	.95575	1.079	1.202	1.234	1.224	1.235	1.152	1.171	.966	.992	1.023	1.137	.909
Viscosity at 100° C. Engler.....	41.75	112.	117.5	9.	302.	166.	169.	162.	109.	465.	.337	229.	5.	9.53	17.
Lunge tar tester at 100° C. about 5 hrs.	(1) 2	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace	Trace
Lunge tar tester at 25° (reading to 14°)	(1) Too hard	17.	656.	59.	13.	20.	13.	28.	15.	59° C.	188.	Too soft	49	20	Too soft
Loss on evaporation at 105° C., 21 hrs., 3 1/2 Dish.....	12.95%	1.75%	13%	6.5%	9.5%	14.7%	12.75%	9.75%	11.5%	13.15%	7.1%	4.6%	2.2%	13.35%	31.6%
Penetration of this residue at 4° C.	47.825	Too soft	69.5	14.	Too hard	Too hard	Too hard	3	Too hard	Too hard	50.	107	10	Too hard	15
Penetration of this residue at 25° C.	(1) Too soft	(3) 128.1666	Too soft	59.	13.	20.	13.	28.	15.	59° C.	188.	Too soft	49	20	Too soft
Melting point of this residue.....	45.75° C.	22° C.	22° C.	52° C.	58° C.	52° C.	60° C.	48° C.	58° C.	59° C.	28° C.	22° C.	33° C.	50° C.	32° C.
Loss on evaporation at 205° C., 3 hrs.	26.8125	7.5	19.75	21.5	26.	31.2	18.	14.25	29.35	23.90	13.	11.45	13.40	16.65	13.92
Loss on evaporation at 205° C., 5 hrs.	18.333	146.5	30.5	20.5	29.	31.2	22.17	19.25	33.65	27.35	14.5	14.40	15.80	20.25	44.95
Penetration of this residue at 4° C.	55.333	Too soft	97.5	6	Too hard	Too hard	Too hard	Too hard	Too hard	Too hard	20.	25.	Too hard	Too hard	Too hard
Penetration of this residue at 25° C.	68.866° C.	84° C.	46° C.	84° C.	87° C.	69° C.	76° C.	71° C.	95° C.	91° C.	68.	106.	69° C.	70° C.	78° C.
Melting point of this residue.....	1.7166	455.	1.87	52.	.....	.....	.....	.....	.....	.....	58.	40° C.	69° C.	70° C.	88° C.
Paraffine scale.....	75.3666	93.85	79.9	70.	.....	.....	.....	.....	.....	.....	84.14	92.14	1.14	66.52	64.59
Solubility in 88° naphtha.....	Sticky	Sticky	Sticky	Sticky	214° C.	163° C.	185° C.	130° C.	213° C.	190° C.	Sticky	Sticky	Sticky	Sticky	Sticky
Character of residue when evaporated glass.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Initial temperature of distillate.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Room temp. 105° C. to 170° C.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Room temp. 170° C. to 225° C.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Room temp. 225° C. to 270° C.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Room temp. 270° C. to 300° C.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Temp. when distillate equals the % loss on evaporation at 105° C.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

TABLE C (Continued).

Analysis.	Name of Material.														
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Water soluble material.....	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Free carbon insoluble in CS ₂	.87	None	None	None	None	Trace	None	None	None	None	None	None	None	None	None
Insoluble in carbon tetrachloride.....	.....	1.29	.37	.23	.....	.2	.56	.....	.....	4.14	(1) 100%	(2) 100%	(1) 100%	(1) 100%	(1) 100%
Ash.....	Trace	.72	Trace	Trace	Trace	Trace	.43	.04	Trace	8.1	(1) .05	(2) Trace	Trace	Trace	Trace
Fixed carbon less free carbon.....	12.71	12.67	13.9	12.79	22.42	6.36	662	9.62	23.02	5.72	13.27	20.04	13.2	8.91	13.2
Specific gravity.....	1.101	.977	.961	.963	1.153	.962	.9876	1.266	1.177	1.078	1.316	1.147	1.72	9.46	1.72
Viscosity at 100° C. Engler.....	17.	83.	7.	25.95	1.85	98	187.	3.63	1.80	9.90	20.	151.	16.	44.	16.
Lunge tar tester at 100° C.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lunge tar tester at 25° (reading to 14°)	269	.....	.....	.....	917	8	.....	790	320	284	(1) Too fluid	(1) Too fluid	(1) Too fluid	(1) Too fluid	(1) Too fluid
Loss on evaporation at 105° C., 21 hrs., 3 1/2 Dish.....	38%	1.2%	25%	None	10%	13.5%	1.95%	10.5%	13.45%	7.5%	36.2%	9.5%	33%	22.35	22.35
Penetration of this residue at 4° C.	5.	25.	25.	32.	4	106	Too soft	Too hard	2.	18.	Too hard	7.	Too hard	20.	20.
Penetration of this residue at 25° C.	67.	38.	106.	161.	29	Too soft	Too soft	20	25.	66.	(1) Too hard	(2) 25	Too hard	60.	60.
Melting point of this residue.....	33° C.	72° C.	41° C.	42° C.	53° C.	15° C.	Too soft	58° C.	65° C.	44° C.	53° C.	45° C.	60° C.	50° C.	50° C.
Loss on evaporation at 205° C., 3 hrs.	53.8	2	3.25	1.85	21.25	18	3.94	19.15	28.40	22	33.	20.	11.5	26.9	26.9
Loss on evaporation at 205° C., 5 hrs.	56.8	2.4	3.85	2.9	28.9	23	4.95	21.35	33.45	26.5	38.5	24.	16.5	27.25	27.25
Penetration of this residue at 4° C.	Too hard	16.	14.	21	Too hard	37	Too soft	Too hard	Too hard	2.	(1) 12	(2) Too hard	12.	Too hard	12.
Penetration of this residue at 25° C.	Too hard	29.	57.	76	Too hard	131	Too soft	Too hard	Too hard	7.	(1) 65	(2) Too hard	65.	29.	29.
Melting point of this residue.....	Above 100° C.	97° C.	55° C.	66° C.	93° C.	32° C.	Too soft	90° C.	86° C.	91° C.	79° C.	38° C.	58° C.	68° C.	68° C.
Paraffine scale.....	.....	1.38	2.18	1.49	.....	25	.39	.....	.....	.46	12.9	.....	38.8	76.7	76.7
Solubility in 88° naphtha.....	.....	68.32	73.93	80.8	.....	80.1	.34	.....	.....	69.9	.....	.....	Slightly Sticky	Sticky	Sticky
Character of residue when evaporated glass.....	.....	Sticky	Sticky	Sticky	.....	Sticky	Sticky	.....	.....	Sticky	Sticky	.....	.....	.....	.....
Initial temperature of distillate.....	169° C.	.....	.....	.....	223° C.	.....	.....	313° C.	225° C.	.....	133° C.	250° C.	Below 100° C.	.....	.....
Room temp. 105° C. to 170° C.....	None	.....	.....	.....	None	.....	.....	None	None	.....	None	.5%	0	5%	5%
Room temp. 170° C. to 225° C.....	2.1%	.....	.....	.....	None	.....	.....	None	None	.....	2%	None	18%	.....	.....
Room temp. 225° C. to 270° C.....	24.7%	.....	.....	.....	1%	.....	.....	.8%	None	.....	14.9%	None	18%	.....	.....
Room temp. 270° C. to 300° C.....	Temp. when distillate equals the % loss on evaporation at 105° C.	.....	.....	.....	10.5%	.....	.....	7.4%	19.9%	.....	23.6%	1.1%	14%	.....	.....
Temp. when distillate equals the % loss on evaporation at 105° C.	Above 300° C.	.....	.....	.....	296° C.	.....	.....	280° C.	280° C.	.....	288° C.	292° C.	280° C.	.....	.....

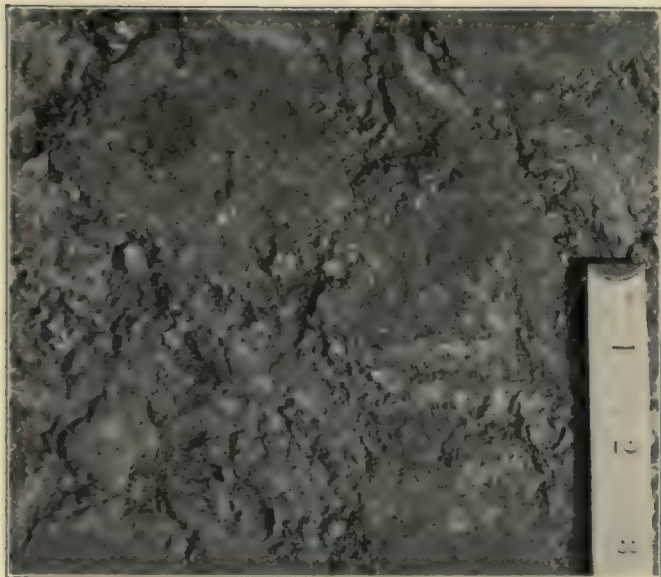


FIGURE IV.—VIEW OF SURFACE OF ONE-COAT WORK—
SECTION 13.

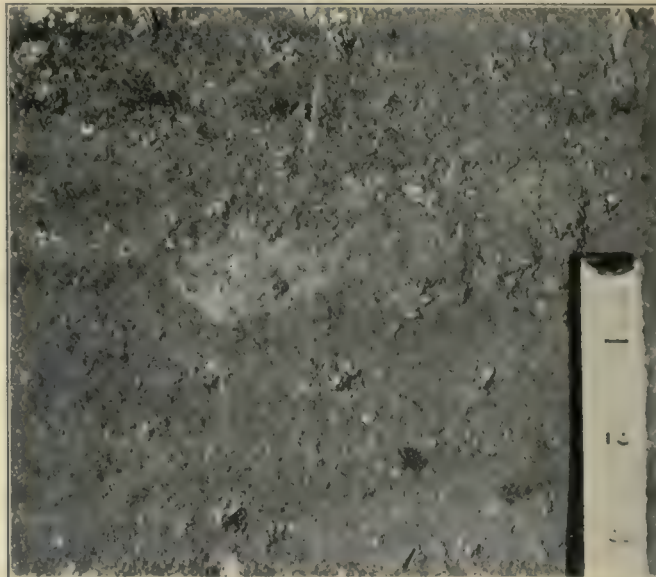


FIGURE V.—VIEW OF SURFACE OF TWO-COAT WORK—
SECTION 13.

The method of "surface treatments" used for Nos. 15 and 16 differed from the foregoing description of the penetration method in that the macadam was practically "bound" with screenings and water, according to modern methods. Its surface was then swept clean of loose material and the pitch (in these cases lighter and much more fluid) applied cold in smaller quantities. A few hours later the clean stone chippings were spread sufficiently to take up any unabsorbed pitch remaining on the road surface, the road rolled lightly, and opened to traffic.

The bituminous work on this road was finally completed late in 1910. Sections Nos. 1, 2 and 3 had, however, proved so unsatisfactory by this time that apparently they would have to be rebuilt and this was done on Sections Nos. 1 and 3 in the spring and summer of 1911. Section No. 2 it has been possible so far to carry along with endurable results under maintenance. It will be given a heavy surface treatment with water gas tar in August, 1912.

The maintenance figures in the table (A) are the maintenance costs (including the rebuilding of sections

Nos. 1 and 3, which rebuilding was performed practically as before described for the original work except that a flush coat of pitch was used over the first coat of chips and then a second coat of chips applied, and which costs include a charge for the pitch used in rebuilding, though it was furnished gratis by the manufacturers) of such further work, further applications of sand or stone chips, further rolling, repairs, maintenance of shoulders, cleaning of waterways, gritting or oiling and gritting (Nos. 5, 7, 18, 19, 20, 23, 24) to remedy slipperiness, painting edges of macadam (13, 14, 17, 18, 27, 28) to prevent cutting away of macadam by traffic, and all other expenses on this work since its completion. For 1912, it has been possible to compile the costs only to May 31, but at this writing (August, 1912), except for the surfacing of Section 2, the retreatment of Sections 15 and 16, and the rolling in of more stone on Sections 21 and 22, no evidence is to be found to indicate any further need this year of more than the lightest kind of maintenance for the macadam of any section.

It should be noted perhaps that the figures, while including the costs of material, labor, superintendence, tools



FIGURE VI.—VIEW OF SURFACE TYPICAL OF SECTIONS
4, 11, 12, 14, 19, 25 AND 28.

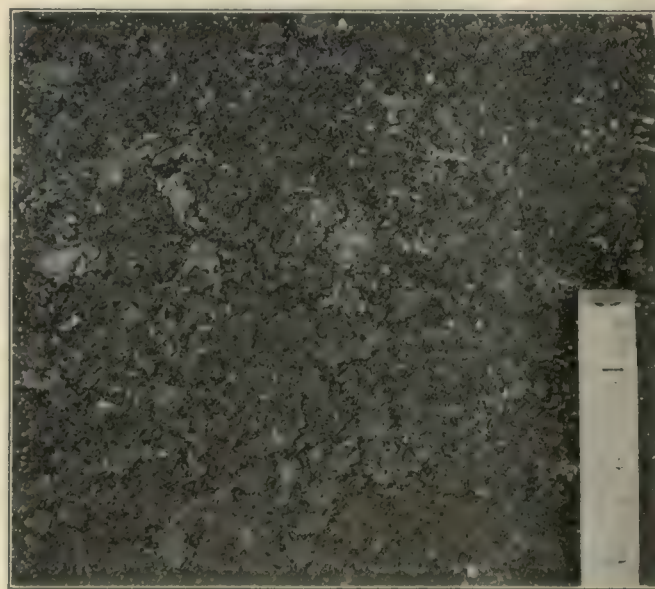


FIGURE VII.—VIEW OF SURFACE TYPICAL OF SECTIONS
7, 8, 9, 10, 15, 16, 20, 22, 24, 26 AND 27.

used up on the work, and a rental or depreciation allowance for machinery of 5 per cent. (on its cost) per month for the time employed, do not include any allowance for "engineering," "administration" nor for "profit and overhead charges."

As regards the physical condition of the various sections from time to time, and at the present writing (August, 1912) the following general statement may be made:

Where the quantity of pitch used was in excess of 1.7 gals. per sq. yd., the "sweating" or bleeding of the pitch in warm weather was objectionable and this especially so in the cases of the tars and of No. 19. In cold, wet or frosty weather, the tars, particularly in those cases where the larger quantities per square yard were used, gave the greatest objections on account of slipperiness, excepting possibly Section 19, which "led all the rest" in this and the first consideration.

It is but fair to call attention to the large amount of pitch used per square yard in the case of No. 19 and to suggest that the deficiencies above noted may be at least partly due to an excess of pitch. As yet no sign of "loss of life" in any of the sections is apparent, except as follows:

The cases referred to of Sections 1 and 3, which are above referred to as rebuilt in 1911; the case of No. 2, which is to be rebuilt in 1912; and the cases of Nos. 15 and 16, where extensive retreatment will be done in 1912, because in these two latter cases the present condition of the surfaces seems to indicate that they will become friable to a serious extent during the coming winter.

At the present time (August, 1912), the condition of most of the various sections seems equally satisfactory and further differentiation in degree of satisfaction seems to rest almost wholly on the mathematical basis of costs, though it is quite probable that to many of the public at least the decision will be affected by a personal preference, real or imaginary, for one material or another. The foregoing does not apply, however, to Sections 21 and 22. These two sections are again, as in 1910 and 1911, showing much lateral movement in their crusts during warm weather and requiring considerable expense for adding and rolling in fresh stone. It may ultimately be necessary to remove the present crusts entirely and to resurface these sections as was done in the case of Section 1 previously referred to.

Those sufficiently interested to do so can secure further facts concerning details of the foregoing by referring to the report (No. 8) of the writer to the Second International Road Congress (Brussels, 1910), and to the Proceedings of the American Society of Civil Engineers for March, 1911, and for April, 1912.

The tables referred to hereinbefore are presented herewith, together with seven illustrations, which may help in the study of this experiment.

Figure No. 1 gives a good idea of the absolute dustlessness of the whole treated 6 miles of the avenue at all times.

Figure No. 2, showing Section 13, gives a view of the results obtained by the use or omission of the "flush coat." The use of the latter was at the request of the company furnishing the material and opposed to the writer's preferences. The apparent defects in the flush coated surface are due to the unavoidable deficiencies of hand pouring. They seem to be gradually disappearing under the kneading action of traffic.

It might be stated here perhaps that, owing to the use of this avenue as an entrance into Baltimore for farm products drawn by smooth shod horses, it seemed desirable to the writer that the surfaces resulting from the treatments should not be, nor become objectionably slippery. Hence, a surface like that in the background of this pic-

ture (Figure No. 2) was striven for. Such a surface was first obtained in many cases (Sections 1, 10, 11, 12, 13, 14, 17 and 18) but it more or less quickly sealed itself up in all such cases except on Section 13. On Sections 14, 17 and 18, this sealing up has been going on gradually and is now more or less completed. On Section 13, however, there seems to have been no change such as this taking place and the surface presents the same appearance that it did when first finished (see Figures 4 and 5).

Figure No. 3. This photograph is most interesting because of the demonstration it gives as to the different appearance produced by a change in angle of the light on the object being photographed. The "one coat" work is here in the foreground.

Figure No. 6 is typical of the surfaces obtained, where the "oil asphalts" were used and covered with sand or stone chips, and after traffic had compacted the surface and largely ground up the chips.

Figure No. 7 is typical of the surfaces obtained where tars were used and covered with stone chips. This surface is generally harder and more slippery than those of the asphalts, and this fact seems evidenced by the photographs themselves.

In conclusion it should perhaps be noted that the bituminous work on Park Heights Avenue was not merely an "out-of-door-laboratory" experiment but a practical performance of work to meet actual conditions. At the time the work was begun, not as much was generally known concerning many of the points involved as is now conceded. The forces employed were new to their work, many of the materials unproved and some of the principles involved were disputed.

Unquestionably some expense was incurred which would be avoided were the work now starting. But the cost figures are actual and are given without reservation as to what "might have been" or without reduction or alteration to improve their appearance on the basis of certain "ifs."

One great value of this particular work strikes the writer as coming from the appreciable length of each section, there being no confusion of impressions on inspection because of lack of sufficient demarcation under traffic.

The prices paid for labor and materials were as follows:

LABOR.	
Foreman, per month.....	\$75.00
Foreman, per month.....	60.00
Single teams, per day of 10 hrs.....	2.75
Double teams, per day of 10 hrs.....	5.00
Labor, per day of 10 hrs.....	1.50—\$1.75
STONE.	
Screenings, per ton (delivered).....	1.60
$\frac{3}{4}$ screenings, per ton (delivered).....	1.80—\$1.90
No. 2 screenings, per ton (delivered)....	1.30—\$1.70
PITCH.	
Barber Asphalt Co.'s per gal. (delivered).	0.138 in tank cars
Consolidated Gas, Elec. Light & Power Co.	0.05 " bbls.
"Fairfield" Binder	0.076 " tank cars
"Fairfield Anti-Dust"	0.085 " bbls.
Gulf	0.065 " tank cars
Headley's	0.109 " tank cars
"Sarco"	0.120 " canisters
Standard Oil	0.075 " bbls.
"Tarite"	0.093 " tank cars
"Tarvia X"	0.075 " tank cars
Texas Co.'s	0.081 " tank cars
Texaco Special	0.115 " bbls.
U. G. I Binder	0.065 " tank cars
U. G. I. "Anti-Dust"	0.103 " bbls.
Warren's	0.101 " tank cars
Glutrin	0.140 " bbls.

The paving scheme outlined for Callao, Peru, includes the construction of 448,492 sq. yds. of granite block pavement and 119,598 sq. yds. of concrete slab sidewalks. There is now available for the work a surplus of \$40,000 to which there will be added a supercharge of one per cent. on customs dues collected at the port as soon as sewer work, to which that money is now devoted, shall have been completed. In addition to these funds, 83 cts. per sq. meter for street paving and 97 cts. per sq. meter for sidewalks will be secured from owners of property abutting on the improvements.

California's State Highway*

By AUSTIN B. FLETCHER, M. Am. Soc. C. E.

Highway Engineer, California Highway Commission

The California Highway Commission has been engaged in its duties very nearly one year. On August 7, 1911, the appointed members of the Advisory Board of the Department of Engineering, Messrs. Towne, Blaney and Darlington, were commissioned by the Governor, and as soon thereafter as possible the Advisory Board appointed them as an executive committee of the Department, to be known as the California Highway Commission, giving to them as complete control over state highway matters as the law permits.

State Highway Routes

California, unlike Eastern states, did not provide for a commission to investigate the needs of the state in the matter of highways before appropriating money for their construction. The California State Highways Act, which is the law and the gospel under which the state highway routes must be selected, and in accordance with which the roads must be built, in a general way, outlines the routes.

In the language of the act: "The route or routes of said state highways shall be selected by the Department of Engineering, and said route shall be so selected and said highways so laid out and constructed or acquired as to constitute a continuous and connected state highway system running north and south through the state, traversing the Sacramento and San Joaquin Valleys and along the Pacific Coast by the most direct and practicable routes, connecting the county seats of the several counties through which it passes and joining the centers of population, together with such branch roads as may be necessary to connect therewith the several county seats lying east and west of such state highway."

The precise meaning of the section of the act just quoted has given the public, the Commission and its legal advisers food for much thought. There is no doubt that a line down the coast and a line down the Sacramento and San Joaquin Valleys were contemplated, but how to connect the county seats and centers of population by the "most direct and practicable routes" and to connect the county seats east and west of the state highways by branches so as to satisfy the law and the people is a problem difficult of solution.

Fortunately, except in perhaps a half dozen instances, it seems probable that there will be no serious disagreement as to the proper location for the routes. It is natural that each community should wish to have the main line of the highway pass through its borders, and it is obvious that such a line would be so meandering as to be impossible because of its indirectness and consequently greatly increased length.

The Commissioners have been obliged to take a broad view of the subject. The state highway system must be planned from a state-wide viewpoint, and no undue emphasis should be given to the desires of the communities themselves. In the absence of rulings by the courts, it would seem that the command of the statute that the state highway shall follow the "most direct and practicable routes" clothes the Commissioners and the Advisory Board with a good deal of discretion in locating the lines of the highways.

Acting upon that belief the Commission has, in a few instances, proposed to locate the main route of the highway in such a manner that one or more county seats would

not be on it, and could reach it only by a lateral. In several cases such action has aroused a storm of protest. All sorts of reasons have been credited to the Highway Commission and to the administration, it having been even alleged that the state highways are being routed for political purposes, and to buy votes. It hardly seems to be worth while to deny such allegations. The writer disclaims any close acquaintance with so-called practical politics, but he has been engaged in public work for so many years that he believes himself able to smell the animal when it is prowling about. Not only has he seen no evidence of politics in highway routing, but on the contrary the accredited friends of the administration have abused the Highway Commissioners for their proposed routings more than have its enemies. The highway work, in all its roots and branches, has been and is singularly free from the sinister machinations of practical politicians.

Early in its work the Commission chose certain main routes as follows:

Route 1.	San Francisco to Oregon line.....	421 miles
Route 2.	San Francisco to San Diego via Los Angeles.....	592 miles
Route 3.	Sacramento to Oregon line via east side of river and Redding.....	344 miles
Route 4.	Sacramento to Los Angeles via San Joaquin Valley.....	445 miles
Route 5.	Stockton to Santa Cruz via Oakland.....	133 miles
Route 6.	Sacramento to Woodland Junction.....	20 miles
Route 7.	Tehama to Benicia.....	191 miles
Route 8.	Hopland to Vallejo via Lake County.....	107 miles
Route 9.	Los Angeles to Riverside.....	46 miles

These routes make a total length of approximately 2,300 miles. To complete the system apparently contemplated by the statute several hundred miles more of laterals and connections must be provided for.

Organization

In order to secure what the Commission considered the most efficient organization, conforming to the lines of the best practice among the large corporations, the following plan was adopted:

The Highway Engineer was made Chief Executive, corresponding in his relations to the different departments of the Commission to the general manager of a large private corporation. Without reference to the public character of this work, the plan of dividing responsibility is along the same lines as if this Commission were a private corporation engaged in the business of building roads. The Highway Engineer (or chief executive) has directly responsible to him the following divisions or departments of the work:

Engineering Department.—This is under the working supervision of the Assistant Highway Engineer. The work of this department is divided into eight subdivisions, viz.: the headquarters, the divisions Nos. I, II, III, IV, V, VI and VII, which represent the headquarters of work in the different parts of the state. Each one of these divisions is in charge of a division engineer, reporting directly to the headquarters office.

Purchasing Department.—Reporting directly to the Highway Engineer is the purchasing department, which will be in charge of all purchases, materials, equipment, etc., and will also have control and direction of the traffic work later on when the department is transferring material and equipment from one place to another. Up to the present time the Highway Engineer has been handling this department of the work with his engineering staff.

Accounting Department.—Reporting directly to the Highway Engineer is the accounting department, which is responsible for the records and accounts of the Commis-

*Paper presented at the meeting of the Pacific Highway Association, San Francisco, Cal., August 5, 1912.

sion. The work of this department is transacted chiefly in the headquarters office, building up from records and reports sent in from the division offices.

Finance and Disbursing Department.—This department reports directly to the Highway Engineer, and is responsible for the disbursing of all moneys from both the headquarters and division offices.

The total number of people in the employ of the Commission July 15, 1912, was 260, and the following table shows them classified by divisions:

	Headquarters.	I.	II.	III.	IV.	V.	VI.	VII.	Total.
Secretary	1								1
Assistant Secretary	1								1
Assistant Highway Engineer	1								1
Division Engineers		1	1	1	1	1	1	1	7
Principal Assistant Engineer		1	1	1	1	1	1	1	7
Attorney	1								1
Right of Way Agent	1								1
Accountants and Clerks	3	1	1	1	1	1	1	1	10
Stenographers	4				1	1	1	1	8
Typists	1								1
Messenger	1								1
Geologist	1								1
Testing Engineer									
Draftsmen and Computers	5			5		5			15
Chiefs of Party		4	4	4	5	4	3	6	30
Instrument Men		4	4	4	6	4	4	6	32
Rodmen		8	7	9	12	8	11	8	63
Axmen		5	2	3		4			14
Teamsters		1	3						4
Cooks		4	4			4	1	6	19
	21	33	32	28	38	37	27	44	260

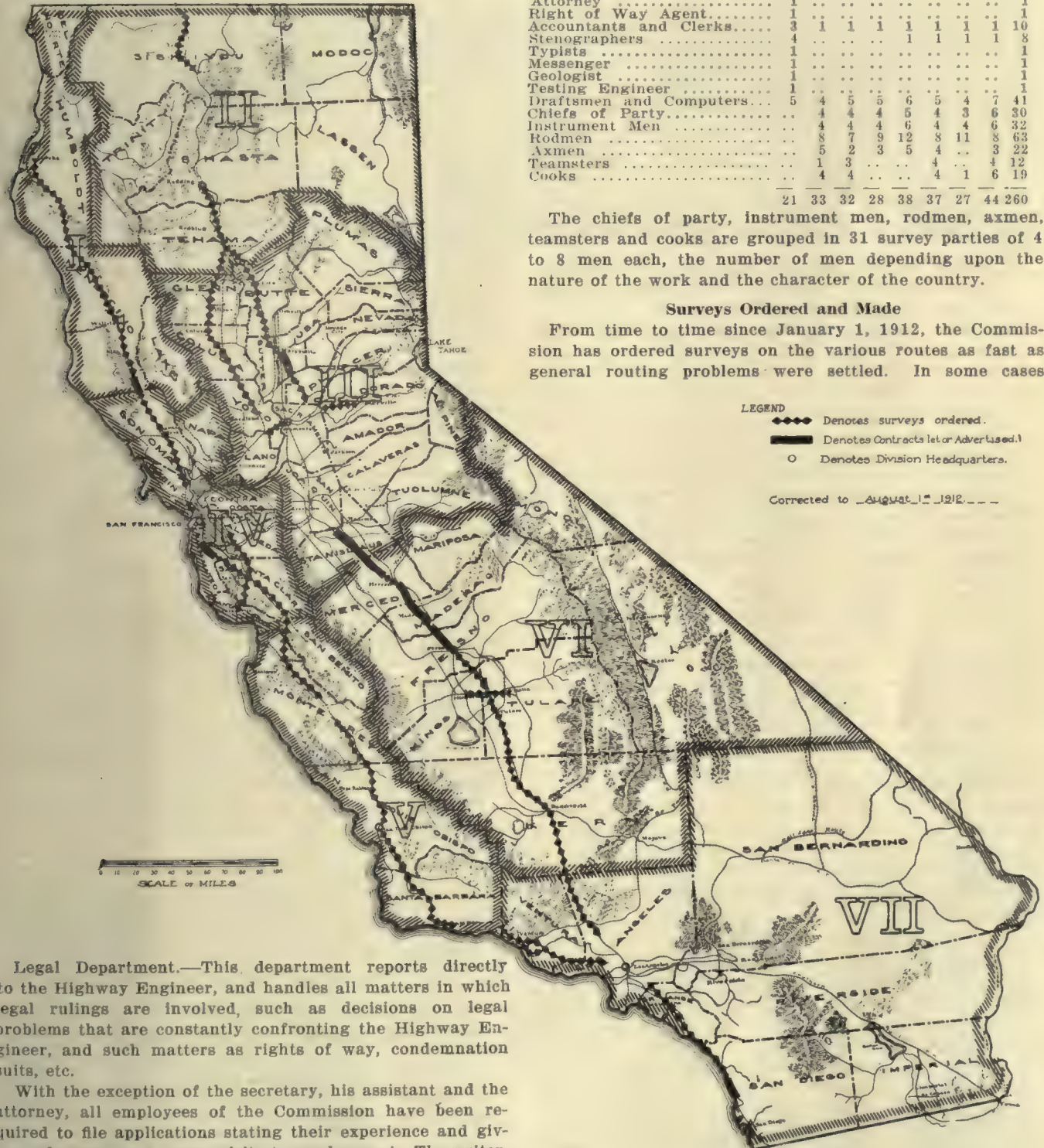
The chiefs of party, instrument men, rodmen, axmen, teamsters and cooks are grouped in 31 survey parties of 4 to 8 men each, the number of men depending upon the nature of the work and the character of the country.

Surveys Ordered and Made

From time to time since January 1, 1912, the Commission has ordered surveys on the various routes as fast as general routing problems were settled. In some cases

LEGEND
 ◆◆◆ Denotes surveys ordered.
 — Denotes Contracts let or Advertised.
 O Denotes Division Headquarters.

Corrected to August 1st 1912.



MAP OF CALIFORNIA STATE HIGHWAY SYSTEM.

Legal Department.—This department reports directly to the Highway Engineer, and handles all matters in which legal rulings are involved, such as decisions on legal problems that are constantly confronting the Highway Engineer, and such matters as rights of way, condemnation suits, etc.

With the exception of the secretary, his assistant and the attorney, all employees of the Commission have been required to file applications stating their experience and giving references as a prerequisite to employment. The writer, who has recommended for employment 257 of the total 260 employees, is happy to be able to assert that he does not know the political inclination of any one of them. They were all selected because they were supposed to be especially fitted for the duties intrusted to them.

The payroll for the month ending July 15, 1912, shows that the average monthly salary of the 260 employees already accounted for is \$91.02.

reconnaissances only were ordered. In others two or more surveys were ordered between objective points to determine which was the best. At the present time 31 survey parties are engaged in such work, and the surveys are proceeding as rapidly as careful work will permit. The survey notes go from the field to the division offices, where the plans

are made by draftsmen. Ultimately they are sent to the headquarters at Sacramento with the reports of the division engineers for revision and correction when necessary.

To this date approximately 1,500 miles of road survey have been ordered by the Commission, and of this mileage nearly 800 miles of field work has been completed, and more than 200 miles in addition is in process. The survey orders were carefully distributed throughout the seven divisions, and no portion of the state is being neglected. The surveys ordered and made are considered as tentative only, and when necessary the lines are changed to conform to new conditions which arise, but, as a rule, the Commission has given earnest consideration to the needs of the state before ordering the surveys. Even in the flat country such surveys cost too much money to be ordered at random.

Quality of Roads

In brief the standard road which the Commission proposes to build will have the following principal characteristics:

1. A right of way not less than 60 ft. in width where it is reasonably possible, and as direct between objective points as is consistently possible.
2. Gradients not exceeding 7 per cent. even in the mountainous parts of the state.
3. Curves as open as possible, and in no case of less than 50 ft. in radius.
4. As many culverts of sufficient capacity as are needed to take care of surface and underground water.
5. A traveled way under ordinary conditions not less than 21 ft. in width, and in the mountains not less than 16 ft. wide, with the center paved or surfaced so as to be hard and smooth under all climatic conditions at all times of the year, the width of surfacing to be in general 15 ft.
6. Smoothly graded roadsides, reserved for future tree planting.

For the main roads of the system the choice for surfacing seems to lie between the so-called oil macadam type and a concrete road with a bituminous surface, the latter being considerably more expensive than the former, but much more desirable as concerns quality and permanency. It is evident that neither type can be adopted for general use unless the cost of the materials and the freight charges for transporting them are reduced to the lowest point possible.

It seems apparent that not less than 2,700 miles of state highway must be built to comply with the provisions of the "State Highways Act." Of this mileage it is possible that one-third, or 900 miles, will be in the mountains, and will require no surfacing other than local gravel, and that 1,800 miles will have to be surfaced with materials more or less expensive.

Freight Rates on Road Materials

The Commission has been negotiating with the Southern Pacific Company concerning freight rates on materials needed in the construction of the roads. It is obvious that to secure a high type of work on the main routes, many tons and cubic yards of broken stone, gravel, cement, oil and other materials must be carried by rail, sometimes for long distances, since rarely will such materials be found within wagon haul distance of the work to be done. The cost of railroad freight will, therefore, be a very large item in the cost of the roads. A crude estimate shows that the Southern Pacific Company will be concerned in hauling materials for not less than 1,000 miles of the state highway. Otherwise expressed, should the 1,000 miles referred to be built of oil macadam, the railroad will have to transport not less than 2,900,000 tons of broken stone and 260,000 barrels of asphaltic oil during the progress of the work, to say nothing of huge quantities of cement, culvert pipe, lumber, reinforcing steel, etc.

The new rates just agreed upon are as follows for any length of haul:

Stone, gravel and sand	0.5 ct. per ton per mile, with a \$6 per car minimum, exclusive of mountain hauls.
Road oil and bituminous rock	0.75 ct. per ton per mile; minimum, \$10 per car.
Asphalt	1 cent per ton per mile, whether in tank, cars or packages; minimum, \$10 per car.
All other commodities	(a) The lowest of any commercial rate, or (b) one-half of any class rate; minimum, \$10 per car.

The latter rate will include cement, steel, culvert pipe and other miscellaneous materials, together with contractors' equipment when shipped marked California Highway Commission.

The writer has not had time to even approximate the probable savings in cost due to these reductions in rates, but it is safe to say that it will be some hundreds of thousands of dollars, all of which will inure to a higher quality of surfacing. Considering the stone, gravel and sand rate alone, the lowest rate heretofore with which the writer is familiar was 0.75 ct. per mile per ton up to a 60-mile haul, with slowly reducing rates for hauls to 150 miles, the rate for the extreme haul being 0.5 ct. per ton. The minimum rate under that arrangement was 25 cts. per ton (about \$12.50 per car).

The writer does not believe that the concession in freight rates by the Southern Pacific Company is merely what has been sometimes called "enlightened self-interest." In part, at least, he believes it to be due to the desire of the company that the roads be built of the best materials procurable and in the best manner. The instructions of the president of the company to his heads of departments to make the reductions in rates as general, as broad and as low as was consistently possible indicate the good will of the management of the Southern Pacific Company toward the state highway project.

Roads Under Contract and Advertised for Bids

There are now 37.5 miles of state highway under contract in widely separated parts of the state, and 58 miles more are now under advertisement, the bids to be opened during the last week of the present month.

Of the roads under contract, 13 miles are in Mendocino County, south of Hopland, where the work consists in relocating and grading the road over the mountains, the rate of grade being reduced from a present maximum of over 12 per cent. to a 7 per cent. minimum.

Five and four-tenths miles are in San Mateo County, where sheet asphalt 24 ft. wide on a 5-in. concrete base is being laid.

Nine miles are in Yuba County, where the road has been entirely relocated, and oiled macadam 15 ft. wide is to be laid.

On all the roads now advertised and awaiting contract, it is proposed to use a hydraulic cement concrete base 15 ft. wide, covered with a thin surface of a bituminous mixture.

Whether or not much additional work of this character may be done depends largely upon the cement manufacturers. It is probable that they will make some reduction in the cement price to induce the Commission to adopt the concrete base for its standard type of construction. Whether the reduction in price will be sufficient to permit of so general a use of concrete is not yet determined.

Conclusion

Notwithstanding the sporadic outbursts in the press which are, of course, due to the most part to the heated political atmosphere which prevails at the present time, the general sentiment of the people of the state is remarkably friendly toward the state highway work. The counties have generously agreed to furnish such rights of way as are needed for relocating the roads, and the Commission expects that none of the bridges of the state which are



APPROACH TO HERRING RUN BRIDGE—THE HARFORD ROAD LEADING OUT OF BALTIMORE, MD.—A BRICK PAVED BOULEVARD FIVE MILES IN LENGTH.

more than 20 ft. in span will have to be built with money from the highway fund. Thus far no county has refused to reconstruct such bridges or to build new ones when the Commission has made the request.

Of the 31 survey parties now at work, 18 are located on the coast highway between Willits on the north and San Diego on the south.

Every effort is being made to have the main state highway routes completed before the great exposition at San Francisco opens its doors in 1915.

New Highway Bridge in Maryland

The largest and finest concrete bridge in the state of Maryland has just been completed across Herring Run, on the Harford Road, which leads out of Baltimore. The construction of this bridge was a part of the work done by the Maryland State Roads Commission.

The bridge consists of three parabolic arches, each end arch having a span of 58 ft. and the central arch a span of 126 ft. The abutments are 20 ft. in thickness at the spring lines, and the piers 14 ft. The length over all is 310 ft. The bridge carries a 50-ft. roadway, which includes two car tracks.

The contract for the bridge was awarded to Warren Bros. Co., of Baltimore, on Aug. 10, 1910, and was sublet to the Luten Bridge Co., of York, Pa. This company began work Jan. 1, 1911, and finished Aug. 1, 1912. The contract price and extra work brought the cost to about \$60,000.

The bridge was erected in one year in the face of many difficulties, the greatest of which were floods last summer, which carried away the entire centering of the big arch and swept away a vast quantity of sand, gravel and cement belonging to the contractors, besides destroying a number of their store houses. The building of the bridge was done under the direction of Major W. W. Crosby, formerly Chief Engineer of the State Roads Commission and now Consulting Engineer to the Commission.

Practically all of the asphalt pavement in the business district of Denver, Colo., has been repaired by means of the municipal asphalt plant since June 1.

During the past year 20 miles of boulevards, 27 miles of sidewalks and 36 miles of gutters were constructed in Victoria, B. C.



HERRING RUN BRIDGE ON THE HARFORD ROAD NEAR BALTIMORE, MD.—THREE REINFORCED CONCRETE ARCH SPANS OF 58, 126 AND 58 FEET.

The Importance of Improved Highways and Especially the Pacific Highway*

By SAMUEL HILL†

Few people know what a modern highway is. Our government has no conception of its economic value. To talk good roads is to bore most people. The relation between roads, waterways and railways is not understood.

Article eight of the constitution of the United States, which provides for the establishment of post offices and post roads is, so far as it relates to roads, a dead letter. For nearly one hundred years no public movement has ever been undertaken for the establishment of highways. Local communities here and there have struggled for betterment of highways, and against existing political methods, which render their construction well-nigh impossible.

In dollars and cents the loss by bad primary transportation over the so-called highways of America is a tax five times as great as the present tariff tax on the people. The vast land grants for railways, the enormous appropriations for waterways, while good in themselves, have never reached the root of the evil, and the waste from lack of highways and the loss to the producers and the consumers every year from marketing their products over these roads, runs into figures which few minds can comprehend.

The United States leads the world in economic steam transportation, the average cost to the public being approximately $\frac{1}{4}$ ct. for hauling a ton one mile over the steam railways. It is not far from the truth to say that the American farmer is at a disadvantage against his European competitor to the extent of paying an excess of 20 cts. cost per ton per mile over the so-called roads in America.

The camp followers and organized parasites, preying on the good roads movement, have run the cost of permanent roads up so high as to frighten people attempting to build permanent highways. The public has overlooked the fact that highways are the property of the people; that to build good highways requires centralized power and a proper standardization. The people most to benefit by good roads most oppose them.

The change necessitated in the character of the highways through the use of the modern self-propelled vehicle makes it possible for the United States to equip itself with modern highways at a cost no greater than the cost abroad. The time is at hand when the government of the United States should create a department of highways, and put competent, trained men at the head of that department to determine proper methods of construction, and the information should be disseminated through the proper channels of state administration.

The Pacific Highway Association, undertaken by intelligent, disinterested, public spirited men, furnishes the best opportunity to establish, build and maintain a highway, which may serve as an object lesson for the Pacific Coast. Premier McBride, of British Columbia, is one of the most advanced statesmen of the day. Governor West, of Oregon, realized the importance of highway construction, and is forceful enough to undertake the work on the right lines in Oregon. Governor Gillette, of California, laid the foundation for the most magnificent system of highways on the Pacific Coast, and his successor, Governor Johnson, took up the work where Governor Gillette left off, and

the appropriation of \$18,000,000 by the voters of the state of California for state roads, supplemented by a further sum of \$12,000,000 for building roads in several counties, will, if properly administered, give California a system of roads unsurpassed to the extent to which those sums will suffice. Of Washington, it need only be said that she was the first state to establish a chair of road building and attempt to educate road builders, and within her borders was built the first building ever marked "Good Roads" in the history of the world. Practically nothing of importance has been accomplished in Washington during the last two years, and the fall election will determine whether that condition will remain or be changed. The press of the Coast has, as a general rule, wisely aided highway development in every way possible, and made generous contributions toward the advocacy of the right methods of building roads.

I know of only four ways of receiving money to form a fund from which roads can be built.

The first is by gift of money or services, as in the case of the state of Oregon by the generous gift of Mr. S. Benson; in California by the liberal subscriptions of certain residents in Santa Barbara County, and by the splendid contributions to road building made in San Diego County, California, by Mr. Scripps, Mr. Spreckles and Mr. Spalding. In Washington Mr. Mike Earles has graded 15 miles of highway, Mr. J. P. Graves has constructed 7 miles of hard surfaced roads, and at Maryhill, Washington, 10 miles of highway have been constructed at private expense to serve as a model for the United States.

It is well to recognize the fact that during the lifetime of most of us, the great majority of highways must be made of earth, and should be, on the West Coast, coated with California asphalt oils. In my opinion, the asphalt macadam road, resilient in character, is the best road to meet all demands incident to traffic, whether vehicles be self-propelled or propelled by animal power.

The second way in which a community can receive money for road building is by direct taxation, but unless the sums so spent are economically used, road building must of necessity be slow.

The third way is by the issuance of bonds, placing the burden for permanent roads, in part at least, on future generations.

The fourth way is by utilizing an asset which unfortunately all the states have, and that is by building roads with convict labor. I am heartily in favor of this method and have advocated it for many years. Labor so employed interferes in no way with free labor and is of great advantage from a humanitarian standpoint in that while roads are being built by convicts, the character of the men is being reformed and their bodies are being strengthened by proper manual labor. The facts are, in Washington, that better results can be obtained by the utilization of convict labor than by hiring men to perform the work. There is no reason why a man, whether rich or poor, should be supported in idleness, and the burden of any man supported in idleness must be borne by the workers. The work should not be limited to men convicted of crime, but proper detention camps should be established, so that those men prone to idleness and vagrancy could be sent direct from the courtroom to the detention camp and compelled to earn their keep and relieve society of the burden of their support.

*Address delivered at the convention of the Pacific Highway Association at San Francisco, Cal., Aug. 5, 1912.

†Honorary Life President, Washington Good Roads Association.

It would hardly be proper at this time to enter into different methods of highway construction, but it is well to point out that the building of roads is a business all by itself, requiring high-class skilled labor. Perhaps the greatest fault, or at least one which conduces to the greatest loss, is that no proper engineering force is in the first instance employed to lay out a road. After finishing my first road, some thirty-five years ago, I sent a pair of horses, drawing a wagonload of hay, down over the road, and then noted the fact that, to rest their muscles, horses zigzagged from side to side, causing the wheels to make a waving line over the surface of the road. When the chauffeur came to drive his car he took a long, swinging curve, and I noted the fact that the tractive power on the highway is unlike the tractive power on the railway—that the best results on a railway are obtained by pulling a load over rails laid on a tangent. Everyone knows that a path across a field is never made in a straight line. Every rider of a bicycle knows that he can go further over a slightly rolling or undulating country than he can over a level country, and with greater ease. No man can walk in a straight line for a mile without getting very tired. Therefore, all highways should be laid out so as to fit the ground on which they lie. Surveys should be run over the proposed line at short distances, a few feet apart, and the quantities of material necessary to be moved should be balanced by longitudinal and vertical curvature as well. No shovelful of earth should be moved until it is known where that shovelful of earth is to go. There is in process of construction a number of appliances which should reduce the cost of moving a yard of rock or road material over a distance of twenty miles (the average distance possible to travel by a loaded team in a day) from \$5 per cu. yd. to 20 cts. per cu. yd., and as 60 per cent of the cost of building roads is substantially in preparing the subgrade and distributing the material, the economy of such methods of movement is apparent.

I cannot close my remarks without referring to the all-important fact that the only thing which will change the trend of our population from cities to the country is the building of permanent highways which can be traveled every day in the year, and which bring in their train good telephone service, good schools, good free rural mail delivery, and aid the producer in finding a market for his produce. No nation has ever permanently prospered that did not have its roots in the soil, and when the fact is recognized that nine-tenths of the wealth of the world is the product of the forest, the mine, the sea and the farm, and that human labor adds only one-tenth to the value of the annual product, a movement will start in earnest to put people on the land. The problem of finding an army or a navy to protect the coast of the United States, which army and navy would be self-supporting, can easily be solved by the building of the Pacific Highway, because along its route the land is so fertile that in most cases a few acres will serve to make the home and provide subsistence, if properly tilled, for a happy family. With a wall of flesh along our western border, we need fear no invader; the homes and the firesides will be protected by that army of farmers, and when you tell me that a farmer is not a warrior I merely remind you of the fact that the greatest battles ever fought on American soil were fought by regiments of men the majority of whom came from the farm.

There is no stronger bond for the permanency of peace than the establishment of good highways, which means the promotion of pleasant relations between the three nations which the highway proposed by your association reaches. Each part of the country offers attractions which the other does not possess. A road must be built which can be traveled every day in the year, so that with the advent of winter those of the North may seek sunny California and Mexico and with the return of spring the beautiful lakes, green forests, lofty mountains and the grand rivers

will lure not only our friends of the South, but bring to our doors those who love the grand in nature the world over.

Accidents in the Streets of London, England

According to a communication from Consul General John L. Griffiths in a recent number of the "Daily Consular and Trade Reports," the increasing danger to those using London's streets is engaging serious attention. This increase is attributed to both the change in the character of traffic and the greater congestion in the streets.

An idea of the great changes that have come about in the nature of traffic during the past few years may be obtained from the following statistics. As recently as nine years ago, according to Mr. Griffith's figures, there were only 13 motor omnibuses in use in London. Now there are over 2,000 and the number is increasing by about 30 each week. Nearly 70,000 motor vehicles of one kind or another have been licensed by the London County Council. In 1903 there were 576 electric street cars in operation in the city while now there are more than 2,500 in use and about 250 under construction. The motor vehicles and electric cars, in the past eight years, have replaced 5,000 horse-drawn hansoms, 1,500 "four-wheelers," 2,000 horse-drawn omnibuses and over 1,000 horse-drawn street cars.

The number of people killed by vehicles in the streets of London during each of the past seven years is shown in the following table:

Year.	No. killed.
1905.....	172
1906.....	212
1907.....	293
1908.....	344
1909.....	306
1910.....	303
1911.....	410
Total	2,040

The causes of the fatalities during the year of 1911 were as follows, arranged in ascending order:

Vehicle.	No. of fatalities.
Horse-drawn omnibus	1
Horse-drawn street car.....	1
Electric street cars	26
Motor omnibuses	107
Horse-drawn carts, etc.....	120
Motor cabs, cars, etc.....	155

As showing the extent to which the motor omnibus is responsible for street accidents, the following figures are of interest:

Year.	No. of omnibuses.	Fatalities.
1905.....	241.....	3
1906.....	783.....	25
1907.....	1,205.....	35*
1908.....	1,133.....	62
1909.....	1,180.....	52
1910.....	1,200.....	66
1911.....	2,000.....	107

*Accidents.

During the seven-year period from 1905 to 1911, inclusive, 350 of the fatal accidents occurring were caused by motor omnibuses, 311 by motor cabs, cars or wagons, and 159 by street cars. The number of persons injured by traffic during the same period was 104,851. During the five years, from 1905 to 1909, inclusive, 550 of the deaths were of children, of whom 312 were less than 7 years old.

Among the various suggested remedies for the dangerous condition of the streets, according to Mr. Griffiths, is the construction of subways under streets at large open street areas where several lines of traffic converge. Although there are already such subways in existence, two in the city proper, comparatively few people make use of them because of the loss of time it involves, and also, perhaps, because of the exertion of descending and ascending the stairs. It is suggested that if the approaches were made wider and inclines instead of stairs used, the subways would be more popular.

An Inspection Trip Over the Roads of Chautauqua County, New York

By A. M. LOOMIS

New York State's dirt highway work is now fairly well organized and running smoothly under the law which has been in force two years, putting everything on a cash basis, wiping out the old day labor plan of working out road taxes, organizing each county under a paid and supposedly efficient county superintendent of highways, and each town under a supposedly equally efficient town superintendent. This organization has already done much for the dirt roads of the state, as every motorist and commercial traveler who drives over country roads can tell. It will do more for the dirt roads of the state if in each county a demonstration be carried out, such as was planned and carried out in Chautauqua County the last day of July and the first day of August this year under the leadership of County Superintendent Willis D. Leet of Fredonia, Chautauqua County.

This demonstration was a highway inspection trip lasting for two days and covering over 200 miles of dirt roads in the county, going through on the trip every township but four and visiting every piece of improved road constructed, under construction or planned to be constructed, either as state or as county road. The trip was made by automobile, and in the party were every supervisor and every town superintendent of highways in the county—the men who approve the tax levy which pays for the highway work and the men who have charge of the expenditure of the money and from whom good roads are expected. There were twenty-three automobiles and about ninety persons in the party, including officials, guests and newspaper men.

It is noteworthy that this entire trip did not cost the county of Chautauqua, nor any town, one penny. The machines were supplied by the two automobile clubs in the county, the Jamestown club and the Dunkirk-Fredonia association, or else by individuals having personal interest in the work. The officials in the party donated their time, without making a charge against either county or town for time or mileage.

This trip was planned by County Superintendent Leet with just one object in view: to illustrate to the highway superintendents just what kind of roads superintendents in other towns were building, what obstacles they had to overcome, and how, and how well, they accomplished it. Mr. Leet had as his guests on the trip Division Engineer James P. Morrissey of Rochester, who has charge of the permanent state and county work of the west end of the State; County Engineer O. M. Sevarance; County Engineer George C. Diehl of Buffalo; Highway Inspector Howard S. Parsons of Buffalo; County Superintendent Alex. Bird of Cattaraugus County and County Superintendent William Torrance of Genesee County.

The party started from Fredonia early Wednesday morning, July 31. The north and west half of the county was visited that day, the mileage being not far from 110 miles, all over dirt roads except about ten miles of improved highway and highway now undergoing permanent improvement. The party reached Jamestown at 7:30 p. m., remaining there all night. Starting at 8:30 Thursday, the party covered the south and east half of the county, covering about 120 miles, all but five of this dirt roads, ending the trip at Fredonia, the starting place, late Thursday afternoon. On the trip the party visited every township in the county except four; visited every piece of improved road yet completed or under contract; passed over almost the entire mileage of the proposed county roads designated

for future permanent improvement, and passed over admittedly the best, and the worst, dirt highways in the county. Not the least important work of the trip was the inspection of about fifteen new modern concrete bridges, some of them of large size, but all built by the township superintendents, and most of them at very moderate prices.

This matter of bridges was pointed out as very important. It was shown how cement arch bridges built by the town, employing all home labor, not only saved much money in actual cost, but kept most of it at home. The largest bridge crossed on the trip was a 75-ft. arch, with a 30-ft. roadway, brick paved, and with a 6-ft. brick sidewalk at each side. This bridge cost the town of Pomfret, on a contract, \$5,600. The town of Ripley has recently built two concrete arch bridges, one in a very difficult and inaccessible place, with a heavy haul of nearly five miles from the nearest railroad station for all material necessary to bring in. This has an arch of 80 ft., with a roadway about 18 ft. wide, and was built by day labor at a cost of but \$3,000. A concrete arch over Dry Brook, in the town of Poland, on the state road now under construction, was built this year by the highway superintendent of that town at a cost of but \$1,050. This has a 16-ft. roadway over an arch of about 50 ft.

Some very bad roads were passed over during the trip, and, on the other hand, there were some very good ones. The bad roads were chiefly in two sections, one a section where the land was rough and the road ran up or down the sides of hills and crossed ravines of fine scenic aspect but of little other value. Here the ditches were straight, but the road was not crowned sufficiently to shed water perfectly, and was also shaded sufficiently to prevent the surface from drying up. Over and over again it was demonstrated that water causes all the bad roads. The dry roads were the good ones.

The other section where bad roads were found was in a level, low-lying section where the roads ran along without grades. Here, with a splendid opportunity for good road making, the highway superintendent had entirely missed his opportunity, and by neglecting to crown the road in the center, straighten it and keep the ditches clear, had permitted the road to become full of water holes, and in places full of ruts. It did not take a man with a megaphone to point out this lesson to occupants of automobiles trying to make reasonable time over this section of highway.

The very finest piece of highway passed over was so good that it should be located so definitely that anyone who wishes may find it and the persons responsible get their share of the credit for the work. This is about eight miles of dirt road between the villages of Sherman and Mayville. It runs through two townships, and so is an equal credit to the highway superintendents of both towns. This road is over a clay-loam soil, not especially favorable to road work, and there is no gravel underdrainage to help. The entire work of perfecting the road is due to three things. First, a perfectly straight ditch, with sufficient width between ditches to give an even crown and room for two loads of hay to pass. Second, a crown of sufficient height to give a surface drainage in any rain storm short of a cloudburst. The amount of the crown was criticised by some, who said that if the road were wet an automobile would slip on the sides. It was pointed out

that this was the reason the road was so perfect; also that it was a dirt road, not designed for automobile traffic on a wet day. The third reason for the perfection of this highway was the constant use thereon of a road hone. The three-piece iron road hone was in use on the road as the party passed over it. This demonstration was the most commented on of any of the trip.

It is worthy of comment that roads of uniformly good surface and condition were noted on at least four-fifths the mileage of the entire trip. It is equally interesting to wonder if the other one-fifth will be improved as a result of the trip.

The most criticism expressed over any one item observed on the entire trip was over the condition of the approaches to the bridges and sluices. In the stretch of road between Sherman and Mayville, previously referred to, most of the sluices were of concrete and every one was so carefully graded that not a jolt could be noted either in going on or off the bridge. In some towns there was a "jumping-off place" at the approach of every bridge and sluice. The wear and tear on both the bridge and the wagon, buggy or automobile forms a very considerable item each year.

A report of this trip will not be complete without a brief mention of the permanent construction now completed or under contract in Chautauqua County. The first piece of permanent road passed over was a 4-mile stretch of brick road south of Fredonia, designed eventually to extend to Jamestown. The concrete base is down, but no brick laid. Next came a piece of concrete base with bituminous surface on the same county road. After this the party passed over the Stockton-Brocton bituminous macadam road under construction and over the Brocton end of this, completed last year. This was the last piece of permanent work encountered until the Findley Lake-Corry (Pa.) road was passed. Here a 7-ft. brick road on concrete base, with an 8-ft. gravel road on each side, is now under construction. At Mayville the state road, which will pass through Jamestown to the east, was visited. This road will be mostly of brick, and bids have been asked for and received, but no contracts let. It will be over 22 miles long when completed. At Jamestown the Jamestown-Frewsburg road, brick on concrete base, with a large amount of concrete retaining walls and sluices, was thoroughly inspected. This is well under construction and is nearly 6 miles in length.

East of Jamestown the first piece of permanent construction in the county was gone over. This is a water bound macadam road. Time has shown that the automobile traffic tears out the binder in this road and leaves it rough and stony, although immeasurably better than the mud road which it replaced. East of this is a 3-mile stretch of bituminous macadam, completed a year ago, and further east a 5-mile stretch of bituminous surfaced concrete base is now under construction. The only other work inspected consisted of two brick roads, one under construction on East Main Road, Fredonia, the other a wide brick highway on Roberts Road, leading into Dunkirk from the southeast, built last year, and very satisfactory.

The lessons of the trip are many. First of all is that good roads have much to do with the prosperity of the farms past which they are built; second, that a dirt road as well as a permanently constructed road may be a good road, but that it takes time, attention and brains to build a good dirt road; third, that the material at hand is not as important as method, since a good road can be built almost anywhere with care and attention. Add to this the use of concrete and the building of bridges by home labor, and the essentials of success in the work are at hand.

Superintendent Leet received thanks all along the line for his work, and a reception was tendered him and a vote of thanks passed at Dunkirk when the party reached that city. County Engineer George C. Diehl of Buffalo stated

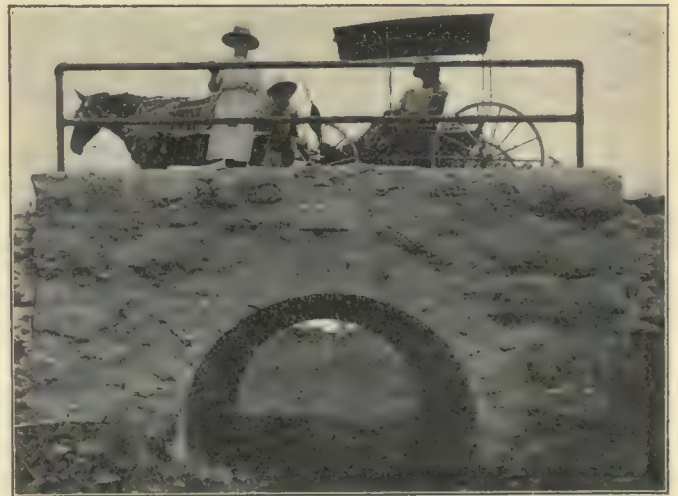
to your correspondent: "I have been on many good roads trips, some including parties of state and nation wide representation, but I have never been on so well planned and so instructive a trip for the purpose designed as this one."

A Practical Memorial

A memorial of considerably more practical value than is usually secured by the building of such monuments is shown in the accompanying illustration. The memorial is a 17-ft. stone culvert on one of the main roads leading into Spring Hill, Kan., and was erected by Charles H. Sowers as a memorial to his father, William Sowers.

William Sowers, who was one of the Kansas pioneers, came to that state about half a century ago and settled at Spring Hill, about 30 miles south of Kansas City. At that time the so-called roads in many sections of the state were practically impassable during rainy seasons, and it is said that it was a frequent occurrence for the pioneer to swim his horses across the fords when the creeks were swollen to rivers by the spring thaws with their attendant freshets.

An incident illustrative of the hardships involved in wagon transportation in the early days is told of the elder Sowers. At one time during the Civil War he had occasion to haul corn to the Union soldiers stationed at Fort Scott.



SOWERS MEMORIAL BRIDGE NEAR SPRING HILL,
JOHNSON COUNTY, KANSAS.

He loaded 100 bushels of shelled corn on his wagon and started out from Spring Hill carrying with him 15 bushels of corn on the ear to feed his three yoke of oxen on the journey. When he reached the Marais des Cygnes River, just south of where the oldest state hospital is now situated, he had to ford the river, as there was no bridge. In the middle of the wagon track there was a large boulder, which was submerged at periods of high water in the river. At such times, according to the story, it was necessary for freighters to get their bearings from ranges on the river banks and drive so that their teams would straddle the boulder, as the water was deep on either side of it. When Sowers reached the river with his corn he found the water high and was obliged to negotiate the ford and clear the boulder in the manner described.

As a memorial to a man who had such difficulties to encounter the Sowers memorial bridge, as it is called, was erected. His son personally constructed the bridge and its approaches and placed on it a granite tablet bearing the inscription "Erected to the Memory of William Sowers." In addition he built, at his own expense, a mile of good road leading to the bridge.

Highway Problems in New Hampshire

At a recent meeting of the Board of Agriculture of New Hampshire at Hampton Beach an address on "Highway Problems in New Hampshire" was made by S. Percy Hooker, State Superintendent of Highways. In the address, from a portion of which the following paragraphs are abstracted, Mr. Hooker discussed several of the problems confronting the road builders of New Hampshire, including the proper types of roads to meet the requirements in that state and methods and costs of maintenance.

If the kind of roads which are considered the best and which are asked for in many cases are built, according to Mr. Hooker, their cost will sometimes be greater than the assessed valuation of the abutting property, and it cannot be expected that the owners of this property will be able or willing to stand the taxes made necessary. The result, therefore, must be that not the best and most expensive roads but the best that can be afforded will have to be built. This means usually that local materials must be employed, and in localities where the materials available are not of the best it means that the road constructed will not be one which can be considered the best. In addition, it also means that the same outlay will secure better roads in one locality than in another. All that can be expected, according to Mr. Hooker, is that for every dollar expended in the construction of the road a value of one hundred cents may be obtained.

The question of maintenance, Mr. Hooker said, is so involved with the method of construction that it has to be carefully considered. He stated as his opinion that there is no greater fallacy than the general belief that any road is a permanent improvement, as the only permanency in road building is the result of changes in alignment and in grade. The surfacing or the construction of the road proper is in no sense a permanent improvement.

The more expensive a road is, according to Mr. Hooker, the greater is the cost of maintenance. The several forms of bituminous construction now in use require a greater outlay for maintenance than does any other kind of road, and if maintenance is neglected the better road will deteriorate more rapidly and in a short length of time become of less value than will the road of a cheaper type. Considering bituminous construction as the highest type next to a brick, concrete or wood pavement, it must be conceded, according to Mr. Hooker, that the annual maintenance charge on roads of the three last named types will be much less than on the bituminous road, but, on the other hand, the added cost of constructing them will entail an interest charge which will equal the cost of maintenance of the bituminous type.

Mr. Hooker stated, in regard to road construction in New Hampshire, that it was his conclusion that only on the so-called tourists roads should the cost per mile exceed from \$3,000 to \$3,500, and pointed out that this means in most sections that the road must be built of gravel. With proper attention to drainage in the original construction, roads of this type, he said, can be maintained for about \$150 per mile in such a manner that except for the dust nuisance they will be in good condition for the entire year. A road cannot be constructed of trap rock for less than \$7,000 to \$8,000 per mile, and its proper maintenance will require an annual expenditure varying from \$400 to \$500 per mile. With the present traffic it is almost impossible to prevent a water bound macadam road from raveling and disintegrating unless a bituminous oil or a tar is applied to the surface at least two years out of

three. On roads where the traffic is heavy and where many automobiles pass it is necessary to apply some dust palliative even upon gravel roads, but experience has shown that a lighter and cheaper oil than is satisfactory for macadam roads may be used on them. A bituminous macadam road, built by either the penetration method or the mixing method, would cost from \$10,000 to \$11,000 per mile, and in order to maintain it in proper condition additional surface applications of bituminous material must be made, which will bring the annual maintenance cost up to \$500 per mile.

In commenting on the relative value of contract work and work by the town, Mr. Hooker said that although a great deal has been said and written about the economy of contract work as contrasted with the other method, from his experience he is inclined to differ radically with the statement. Where the total amount to be expended is less than \$5,000 he is almost certain that the better results can be obtained through town officials than through contractors. The reason for this is obvious, he said, because if the town owns sufficient machinery to build its roads and has capable superintendents the town obtains the full value for every dollar which it expends. On the other hand, if a small contract is advertised the contractor must consider the cost of getting his equipment to the work, and, according to Mr. Hooker, this almost universally entails a charge of at least \$300. The contractor then estimates the actual cost of the work, according to Mr. Hooker, and adds from 15 to 20 per cent. for the rental of his machinery and for his profit. On a \$3,000 contract, therefore, he said, the contractor must and does estimate from \$600 to \$700 to take care of these items, leaving only from \$2,400 to \$2,300 to be actually expended for labor and material.

One of the greatest problems, according to Mr. Hooker, is maintenance. It is not enough to build a good road, and the phrase "a good road is never built but always building" is absolutely true. From the moment construction ceases maintenance must begin. The great fault of all highway laws, according to Mr. Hooker, was, in their inception, the idea that the state should aid in construction, while the maintenance should be taken care of by the municipality. This naturally led to the feeling on the part of the town or municipality that having expended a large sum in the construction of a road, the road had already received an undue share of the town's highway money and should receive no more until roads in other sections of the town had been improved. There is hardly a locality in the United States, he said, where the necessity for constant supervision was realized, and this was absolutely fatal to the roads, since, although built properly so far as the existing knowledge of road building permitted, they went to pieces in a surprisingly short time. Over 50 per cent. of the highways built by state aid in the United States prior to 1908, Mr. Hooker said, were allowed to deteriorate to such an extent that resurfacing had to be resorted to.

In practically all of the states it is now conceded, he said, that maintenance must be placed in the hands of the state in order to obtain efficient results. The Legislature of New Hampshire recognized this by passing at its last session the motor vehicle law which made available for maintenance purposes the license and other fees obtained from motor vehicles.

The most efficient means of maintaining a gravel road,

according to Mr. Hooker, is by the use of a road hone or a split log drag. The hone or drag should be used after every rain which has thoroughly wet the surface, and in this way the contour of the road may be maintained and the tendency to flatten prevented. If the road is kept in such shape that the water runs off, instead of standing on it, much has been done toward keeping the road in proper condition. The chief error in building roads, according to Mr. Hooker, is lack of attention to drainage, not necessarily in the worst sections, but in places where there is only a limited amount of water, and where in the interest of economy the engineer tries to get along without a culvert or underdrain. This frequently leaves the road in such condition that water stands on it, softens the surface and allows traffic to break through, with the result that the road is condemned as being built of unsuitable material, when, as a matter of fact, had the road been kept dry there would have been no complaint. By the use of a road hone a road may be kept in such shape that the water will not stand upon it, but will run to the ditches, and with a patrolman to keep the ditches open the road may be kept in good condition, while without such constant care it would become practically useless. A patrolman with a horse and cart, according to Mr. Hooker, can keep from 7 to 10 miles of road in condition at a cost of practically \$600 per year, and at the end of that time the road will be left in better condition than when he began work upon it. His last work before winter sets in should be the final cleaning of the ditches and the removal of leaves and refuse so that each drain or culvert can do its proper work.

One of the greatest problems in New Hampshire, according to Mr. Hooker, is the care of the town roads. There is no provision in the law for advice or supervision for the treatment of these roads. In many cases, he said, there is only one machine used in caring for them; that is the road machine, and, he stated, that from the samples of work he has seen he thinks that it is a matter of abuse and not use. In many cases, he said, the road machine may be used to greater advantage than any other instrument, as it will properly shape a road which is entirely out of shape, but it seems to him, he says, that in most instances it is used unthinkingly and unknowingly. If a town, instead of endeavoring to use the machine on the entire road system each year, which Mr. Hooker said according to his observation is the habit of many of the towns, would plan its work during the preceding year and treat only one-quarter of its mileage, he believes great good could be accomplished by its use. In the first place, he said, no road can be built by the road machine. If it is intended to use the machine on the road the next year, the bushes should be cut in the fall, the width of the roadway determined and that portion of the highway outside the beaten track brought to that width. The curves should be straightened where possible and the materials should be left in the furrow until the next spring, when the road machine should be used to the extreme of the plowed line, so that the ditch line may be where it was intended to be and the road may be graded by scraping the new material into it. The machine should be followed by a team and men, by means of which the stone, sod, grass and vegetable matter drawn into the middle of the road can be removed, so that the finished roadbed will consist of the new material coming from the bottom of the plowed furrows. Great care should be exercised in regard to the ditches, with especial respect to providing a grade to carry the water to some point where it may leave the road. On the sidehill road a culvert may be necessary, but it frequently happens that if proper attention is given to the ditch line places may be found where the water may be turned from the road on its own side, so saving the cost of the culvert.

The crown of the road should be not over one inch to the foot, according to Mr. Hooker. The water will run down this as easily as down a slope twice as great, and the road will be perfectly safe, and if properly treated should not require reshaping with the road machine again in five years. If the road machine work is supplemented by the use of a hone or drag the road may be kept in first-class condition during the entire period at an expense of less than one-third of what it would cost to go over it with a road machine. This sort of treatment, according to Mr. Hooker, is use of the road machine. The abuse of it, he said, consists of what is usually done in the state: The ground is full of water and the road machine is run on each side of the road, just touching the ditch line and throwing the worn-out material back into the center of the road. The sods, together with the roots of bushes and other vegetable matter, are scraped to the center of the road and the road is continually narrowed. The result is that the decaying vegetable matter in the road leaves a succession of holes which hold the water on the surface, even if the road has been crowned two or three inches to the foot, as it frequently is.

In conclusion, Mr. Hooker stated that in a very broad way his idea of the solution of New Hampshire's highway problem was: First, when building roads reduce the grades and take especial care of the drainage; second, use the material which is available for surfacing, whether or not it is the best material; third, see that the roads are constantly maintained by a patrol or similar system, and, fourth, establish closer relations between state and town highway departments.

Denver Automobilists Pay for Road Repairs

The unusually heavy rains which have fallen in Colorado this year have caused great damage to roads, especially in the eastern portion of the state. Near Denver the effect was so great that certain roads became nearly impassable in places.

As the Highway Department of the city was obliged to bend all its energies to the repair of the city streets no help from that quarter was available for the roads situated outside the limits of the city and county. No help could be secured from the state, either, without the enactment of special enabling legislation. Under these circumstances the work had to be done, if done at all, by some non-official body, and the problem was finally taken up by the Chamber of Commerce.

At a meeting of the officers of the chamber with a number of good roads enthusiasts of Denver, a plan of action was decided upon. As a result of this 3,000 letters were sent out to automobile owners asking for contributions. The amount asked for varied in different cases, and was fixed on the basis of an assessment of \$1 per every \$500 represented by the purchase price of the car owned by the recipient of the request. The letters were sent out on July 29, and several hundred dollars were received in the next morning's mail.

Encouraged by the promptness and generosity of the response, the committee decided to send an appeal for funds to every man shown by the city records to be the owner of an automobile. Seven thousand letters were sent out as a result of this decision, and although up to the middle of August only 325 had responded, the fund pledged and collected amounted to nearly \$5,000.

This amount, it was stated, would be sufficient to make all the most necessary repairs on the road between Denver and Limon, one of the important thoroughfares leading into the former city.

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ORGANIZATION

In carrying out the highway work of a state, county or other administrative division, much depends upon the organization of the force having the work in charge. The manner in which this problem has been solved in the California state highway work is set forth in detail in an article entitled "California State Highway," by Austin B. Fletcher, which appears on other pages of this issue.

The administration of the highway work of a state, and especially of a state where the territory covered and the amount of money expended are large, necessarily involves a great deal of detail. This makes it necessary to employ a comparatively large force, and if the work is to be done efficiently and systematically each group into which the force is divided and each individual in the several groups must have certain specific duties to perform. Some such system of subordinate departments as is employed in California must be evolved and each department provided with a competent head who is responsible for the work of his own department and who reports to the chief executive officer.

Department heads, division and resident engineers and all others having in charge certain work for which they are responsible should, of course, be clothed with sufficient authority to enable them to perform their work. While this may, perhaps, seem too obvious to require emphasis or even mention, it is, nevertheless, a fact that the efficiency of an organization is as often impaired by the failure to invest subordinates with sufficient authority as by any other cause. A division engineer, for instance, should not be held responsible for the proper performance of work in his immediate charge unless he is in a position to carry out, or see that others carry out, the work in accordance with what, to the best of his knowledge and belief, are the best methods.

Besides the failure to delegate authority over the details of the work, another weakness more or less frequently encountered in highway department organizations is the improper distribution of work. It is manifestly impossible to so divide the work that the functions of the different divisions will not overlap to some extent. At the same time, there is some division which can be made by which a minimum amount of such conflict will be developed, and in many organizations in which this weakness is present a careful study of the situation would show where readjustments could be made that would tend to produce greater efficiency of the department as a whole.

Probably in no two states would the same plan of organization be equally effective, since modifications would necessarily have to be made to meet local conditions. Yet certain general principles governing the division of the actual work, the classification and grading of subordinates and the delegation of responsibility and authority are so general as to be applicable in all cases. Except in those states where the amount of work to be done and the amount of money to be expended have made it necessary to devote considerable thought to the organization of the highway department, it is likely that too little attention has been paid to this phase of the work. Organization is one of the phases of highway improvement which the American Road Builders' Association includes in the scope of its activity and one of the subjects with which the association concerns itself at its annual conventions. In solving this problem there lies an opportunity for the association to perform a no small service, and it is to be hoped that its consideration will be given a prominent position in the program of the coming convention.

"REPAIRING" THE ROADS

In many rural communities the spring of each year is the time set apart by the road authorities for the annual "repairing" of the roads. How this is usually accomplished in some sections of the country is well described by S. Percy Hooker, State Superintendent of Highways of New Hampshire, in an address made at a recent meeting of the New Hampshire Board of Agriculture. Mr. Hooker aptly differentiates the manner in which the work is too often done and the manner in which it should be done

by designating the one as the "abuse" of the road machine and the other as its "use." An abstract of Mr. Hooker's address is printed elsewhere in this issue.

To some the picture presented as the "abuse" of the machine may seem overdrawn, but by the many who have seen the process, exactly as described, gone through year after year, its accuracy will be recognized. The inefficient and even careless methods attributed by Mr. Hooker to some New Hampshire towns are as prevalent elsewhere. Why it should be so is somewhat difficult to understand. It is apparently not always caused by ignorance, since foremen and workmen who, when employed in the construction of a new road, would exercise reasonable care to keep roots, sods and other undesirable matter out of the roadbed will often deliberately drag such matter from the ditches with the road machine and leave it in the center of the road when employed on maintenance work.

A large proportion of the public road mileage of the country consists of ordinary earth roads, and for an indefinite time to come such roads will greatly exceed in mileage all other kinds. The proper maintenance of these is one of the most important and at the same time most neglected portions of the work of road improvement. Moreover, while the proper methods to follow are thoroughly understood, this particular kind of work is probably carried on with less regard to following accepted practice than is any other kind. With equipment consisting of one or two road machines and a number of road drags or hones the roads of the average township can be kept in first-class condition during a large part of the year if the equipment is used intelligently. This equipment should be owned by the town and operated by intelligent workmen under the direction of a competent foreman or superintendent. In many cases, the road mileage in a township is large enough to warrant the purchase of a traction engine, and, where this condition obtains, a considerable saving in the cost of working the roads can usually be effected by employing the tractor for hauling the road machines. In some cases, a number of adjoining towns can cooperate by owning a tractor, and perhaps other equipment, jointly. Although entailing a somewhat larger initial outlay for equipment than is usually made by the smaller townships, the purchase of such machinery as that mentioned would, in most cases, prove a paying investment.

Too great emphasis cannot be laid upon the necessity for the proper maintenance of the earth roads of the country. Taken altogether, they carry an enormous proportion of the total traffic, and, if the work be done intelligently, they can be improved at a relatively small cost. The use once a year of the road machine, followed by systematic dragging or honing, will bring an improvement in condition worth a great many times its cost. If nothing else can be done, it is possible to transform a muddy, rough road into an excellent earth road by means of the drag or hone, alone. There are several well constructed, durable metal drags and hones on the market, none of which is expensive and with which it is possible to bring an ordinary earth road to a high degree of efficiency.

THE COMING ROAD CONVENTIONS

On another page of this issue we print a letter from Harold Parker, formerly President of the American Road Builders' Association and for a number of years Chairman of the Massachusetts State Highway Commission, setting forth certain facts in regard to the two road conventions to be held this year. Mr. Parker's letter clearly states the situation as regards the American Road Congress at Atlantic City and the ninth annual convention of the American Road Builders' Association at Cincinnati, and it should

aid in clearing up whatever misunderstanding there may be in the minds of those interested in the general subject of highway improvement.

As stated by Mr. Parker, efforts were made during the winter looking toward the holding of a joint convention by the American Association for Highway Improvement, the American Automobile Association and the American Road Builders' Association. This move was made by the American Association for Highway Improvement, one of the stated purposes of which is "to correlate and harmonize the efforts of all existing organizations working for road improvement," and was regarded by many as an attempt to accomplish this purpose by absorbing the American Road Builders' Association by making it one of the "affiliated" organizations. It was understood, at the time, that should the holding of a joint convention be decided upon, an equal portion of the time would be set aside for each of the three principal associations. In that case, the time allotted to the American Road Builders' Association would, of course, have been devoted to the consideration of those technical and practical questions of organization, construction and maintenance which are of especial interest to road and street officials, engineers and contractors. In other words, that portion of the proceedings held under the auspices of the American Road Builders' Association would have been conducted along the lines of the convention of that organization held at Rochester last year. The reasons for the failure of this plan are stated very briefly by Mr. Parker and were set forth at considerable length in a previous issue of this journal. (See "American Road Builders' Association Not to Affiliate With Other Organizations in Holding a Joint Congress," "Good Roads," May 18, 1912, p. 300.)

The decision to hold separate conventions having been reached, each organization proceeded to plan for its own convention. The American Road Builders' Association, which has been in existence since 1902, went ahead with preparations for a meeting similar to those which it had held in the past, planning to confine its consideration of the subject of highway improvement to the particular phases of organization, construction and maintenance. It was, of course, expected that the American Association for Highway Improvement and its affiliated organizations would, in a similar manner, plan to hold a convention at which its work would be limited to that outlined in the statement of its purposes, which do not include the consideration of the technical side of road building.

This expectation, however, has not been met by the American Association for Highway Improvement, since the plans for the Atlantic City convention contemplate devoting two days to the consideration of technical problems. These two days are to constitute a section, which, to quote from an announcement from the headquarters of the American Road Congress, "will deal with streets, roads, park drives, bridges and culverts." A program, which appears on another page of this issue, has been prepared for these two days, and further evidence of the intention to take up these questions is furnished by the official call, a part of which reads as follows:

The congress will consider questions of the greatest importance relating to the construction, maintenance and administration of roads, streets and bridges. In the field of road construction, intricate problems have arisen in connection with the adaptation of methods of construction to meet the destructive effects of modern traffic. Road maintenance has been almost entirely neglected in the United States, with the result that deterioration of some of our best constructed roads represents a preventable loss aggregating millions of dollars annually. Just now there is a tendency toward remedial action looking to the adoption of continuous and systematic maintenance. In the field of road administration, much complex, inadequate and inappropriate legislation and practice are in force.

Final evidence, if such be needed, as to the intention

of the American Association for Highway Improvement to enter the peculiar field of the American Road Builders' Association may be found in an "announcement to state, county, city and township officials having to deal with streets, parks and highways" issued by officials of the American Road Congress, in which it is stated that "every feature of street, park, road and bridge construction, maintenance and administration will be thoroughly dealt with by the greatest authorities in their respective fields."

The American Association for Highway Improvement, working with local good roads associations and with national and local automobile organizations, has an opportunity to carry out a necessary work of great magnitude and one which lies entirely within the scope of the purposes for which, according to its own announcement, it was organized, and which do not include the technical consideration of road and street construction and maintenance. There is need, perhaps, "to correlate and harmonize the efforts" of all existing organizations engaged in the stimulation of public sentiment for road improvement. The stated purpose of the association, "to strive for wise, equitable and uniform road legislation in every state," is meritorious in so far as it relates to securing wise and equitable legislation, though it is a question whether or not uniform legislation in every state is desirable. The remaining purposes of the association—which are to aid in bringing about efficient road administration, to seek continuous and systematic maintenance and to advocate the correlation of all road construction—are worthy. It is doubtful, however, if an organization committed to a policy of this kind can successfully undertake, in addition, the functions of a technical society. The good roads movement, so called, has two distinct sides—the popular and the technical—and efforts to combine the consideration of the two in the sessions of a single convention are never attended by satisfactory results. In such cases, each side suffers and neither is presented as adequately as it would be were it considered separately.

The American Road Builders' Association has recognized this fact and has limited its activities to the technical side of the question. Its membership is composed, for the most part, of street and road officials, engineers and contractors, and it also includes others to whom this phase of the problem is of direct and especial interest. Moreover, a large proportion of the members and others who attend the conventions of the association are interested only in this phase of highway work and do not attend conventions at which the good roads propaganda and questions of legislation are the principal topics. Because of the character of its membership and of the men who attend its meetings, the American Road Builders' Association is better equipped to carry on the peculiar work for which it stands than is any other organization.

Ohio Adopts Constitutional Amendment

The voters of Ohio, at the special election held on Sept. 3 to decide upon the amendments approved by the Ohio constitutional convention, ratified amendment 29, which provides for extending the state bond limit to \$50,000,000, for the purpose of improving a system of inter-county wagon roads throughout the state.

The amendment reads as follows:

"The State may contract debts to supply casual deficits of failures in revenues, or to meet expenses not otherwise provided for; but the aggregate amount of such debts shall be applied for the purpose for which it was obtained, or to repay the debts so contracted, and to no other purpose whatever: Provided, however, that laws may be passed to contract debts and authorized issues of bonds to an amount which in the aggregate of all issues shall not exceed fifty million dollars for the purpose of constructing, rebuilding, improving and repairing a system of inter-county wagon roads throughout the state. Not to exceed ten million dollars of such bonds shall

be issued in one year, and there shall be added and collected annually by taxation an amount sufficient to pay the interest on said bonds and to provide a sinking fund for their redemption at maturity, and laws shall be passed to provide for the maintenance of said roads. Such wagon roads shall be determined under general laws and cost of constructing, rebuilding, improving, repairing and maintaining the same shall be paid by the state. The provisions of this section shall not be limited or controlled by Section six of Article 12."

The apportionments of the tax burden that will be borne by the people of the state in order to liquidate the bonds issued under this amendment, were set forth at length in "Good Roads," for July 27, 1912.

State Highway Funds in Alabama

Fifteen counties of Alabama have not as yet made application for their shares of the state aid appropriation for the construction of public highways for the years 1911-12, and must make such application before January 1, 1913, or lose their allotments.

Thirty counties of the state have received their appropriations for 1911, and about 25 have received both the 1911 appropriations and their pro rata allotments for the present year. The rest have made no effort at all to take advantage of the state aid provided by law.

Under the law, any county that does not claim its share of the state's appropriation for two successive years loses the money, and if the 15 counties referred to fail to take the necessary steps to secure their appropriations, which amount to \$4,000 for each county, within the specified time, the money will revert to the general fund.

The delinquent counties can claim their shares of the 1913 apportionment together with their pro rata shares of whatever other money may have reverted back to the general fund from failure of counties to claim their appropriation.

State Highway Engineer W. S. Keller and Assistant Engineer Boyd are using their efforts to interest every county in the state that has not made application for its share of the appropriation to do so within the time limit, and it is expected that the majority of these counties will make application in time.

Philadelphia Expending Large Sums in Street Work

Highway work to the amount of nearly \$3,500,000 will be under construction or contracted for in the city of Philadelphia by the end of September.

A statement issued by Chief Connell, of the Bureau of Highways and Street Cleaning, shows the class of work and the cost of each, to be as follows: Asphalt, 182 contracts, cost \$1,208,368; grading, 38 contracts, cost, \$311,441; wood block, 16 contracts, cost \$275,522; bituminous pavement, 20 contracts, cost \$245,658; stoning, 36 contracts, cost \$138,091; granite, 20 contracts, \$180,049; brick, 24 contracts, \$90,199. This makes a total of 336 contracts at a cost of \$2,449,328, and shows an increase of 108 contracts and an expenditure of \$1,300,000 over the statement issued July 31. The number of contracts and the value of the work will be increased to the extent of approximately \$1,000,000 within the next month. Mr. Connell states that it is expected that by the middle of September work requiring the expenditure of all available funds except appropriations for such work as is held up for subsurface structures, legal difficulties or pending transfer of appropriations, will be under contract.

The department is now making an investigation of the pavements surrounding school buildings with a view to substituting for noisy pavements such material as wood block or asphalt, in order that there will be as little noise as possible to interfere with the school work. It is expected that this work will be under contract within the next month.

CORRESPONDENCE

The Two Coming Road Conventions

Editor "Good Roads":

I have observed that a certain confusion in regard to the purposes and meaning of the two conventions which are to be held in the interest of road improvement exists pretty generally. One of these conventions is to be held at Atlantic City and the other in Cincinnati. It is not clearly understood by those interested in these matters why there should be two conventions, or, in short, why one is not enough.

It would be out of place for me to describe here the causes which have led to this situation, but I think it fair to set forth in your journal certain facts which should enable those interested to determine which of the two best represents ideas for which they stand.

The congress or convention to be held at Atlantic City, Sept. 30 to Oct. 5, is under the direction of Logan Waller Page, Director of the United States Office of Public Roads, and President of the American Good Roads Congress, and this meeting is, in fact, the convention of the American Association for Highway Improvement of which Mr. Page is also President, and its affiliated organizations, of which the American Automobile Association and National Association of Road Machinery and Material Manufacturers are leading ones.

Mr. Page has assured me many times that his association took part in the promulgation of the propaganda for good roads alone, and that its activities would be confined entirely to the effort, "to stimulate sentiment for wise legislation and correlate and harmonize existing organizations." These aims and limitations, it should be observed, are essentially those set forth as the purposes of the American Association for Highway Improvement.

The convention of the American Road Builders' Association, to be held at Cincinnati, Dec. 3 to 6, on the other hand, is a meeting of those who actually build the roads and whose efforts are directed along the lines of "organization, construction and maintenance," and it has nothing to do with legislation or the stimulation of sentiment.

It should be observed that there is a distinct line of demarcation between the recognized objects of these conventions and the lines of usefulness of each are perfectly well defined. The confusion to which I refer appears to have arisen on account of, as I see it, the unwarranted assumption on the part of the American Association for Highway Improvement, which is undoubtedly the directing element at the Atlantic City convention, of the recognized functions and prerogatives of the American Road Builders' Association. An effort was made during the past winter to have one great meeting held jointly by the American Road Builders' Association, the oldest of all of these,

the American Association for Highway Improvement, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers. This might have been a wise thing to do—it was worth the trying, anyhow—but divergent interest and individual desires for precedence soon showed that harmonious and concerted action could not long continue. It was determined therefore that the American Road Builders' Association should separate and hold a convention where those matters in which it was particularly interested, and nothing else, should be treated and considered, leaving it to the other associations to take such measures as their wisdom should evolve, but not in justice and equity to trespass on the recognized territory of the American Road Builders.

Had this line of procedure been followed by each no uncertainty as to the actual condition could possibly have arisen, but there can be absolutely no question but that the convention at Atlantic City has invaded the field peculiarly belonging to the American Road Builders' Association, and has so exploited the purposes and scope of that meeting that the public mind has become confused and many of those really interested hardly know which is the convention to which they should give their allegiance.

I am writing this letter to assist in making it clear what the legitimate object of each convention is. The American Road Builders' Association is precisely the same, so far as its intents and purposes are concerned, as it has been for many years and it desires only to bring together those people and those interests which are related to the organization, construction and maintenance of roads.

HAROLD PARKER.

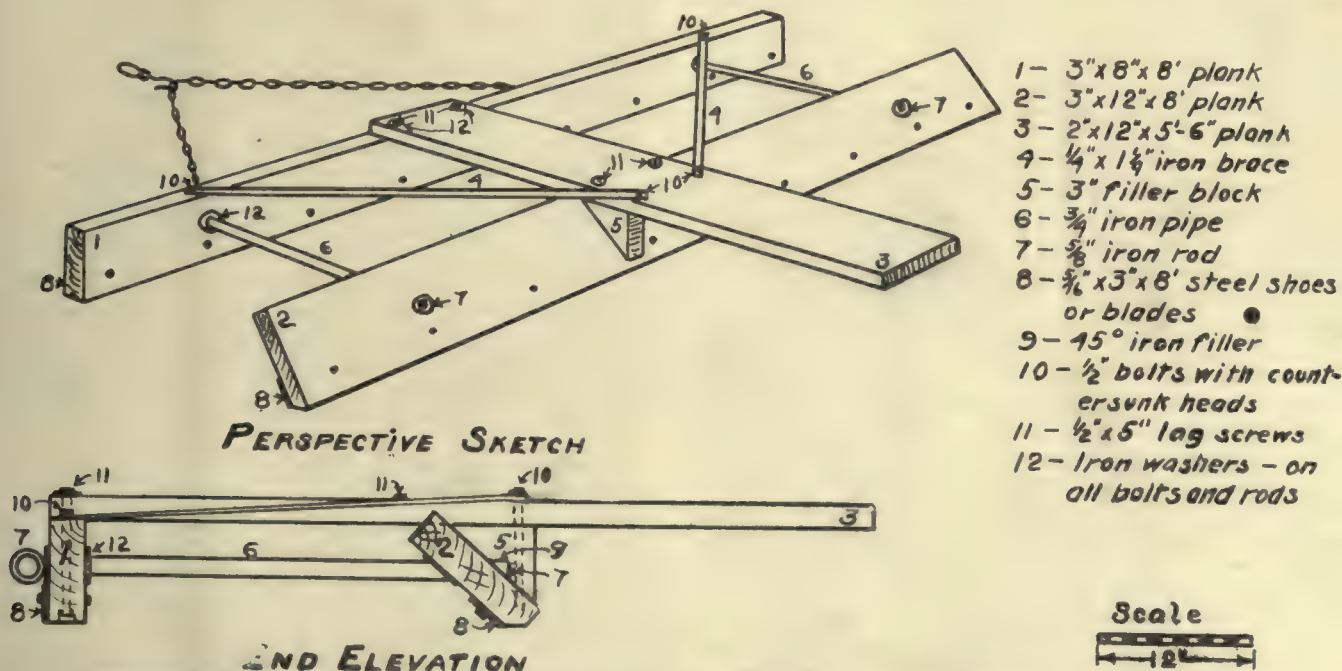
New York, N. Y.

New Road Drag

Editor "Good Roads":

Although the use of the King road drag has become quite common throughout the country, and its value as a road machine is unquestioned, the results have not been uniformly satisfactory. In nearly all cases where the results have been disappointing the fault has been due to a lack of sufficient knowledge, on the part of the operator, as to the proper application of the principle of the road drag. It has been considered by some as a road making machine while it is primarily intended for maintenance purposes, and in fact for maintenance of earth road surfaces only. It cannot be used to the best advantage on a road which has not previously been properly graded.

A knowledge of the action of road materials in each locality after heavy rains is most essential. On roads that "bake" when drying out, the road drag should be used somewhat sooner after rains than on those that do not possess this quality. The object in the former case being to "smear" as well as to smooth the surface, this must be done before



PERSPECTIVE SKETCH AND END ELEVATION OF HOME-MADE ROAD DRAG WITH TABLE OF PARTS.

the material dries and hardens. When the work is done thoroughly and just before the material begins to bake this smearing makes a nearly waterproof coating. In all cases the road drag should be used before the road surface material is dry enough to pulverize under the road drag.

One difficulty that has increased the labor in using the road drag and also lessened its efficiency is that of the loose material piling up in front of the forward drag timber. By setting the drag at an angle of about 60° with the line of the road it is the intention of most operators to force this accumulating material laterally to the inner end of the drag where it is deposited in a small ridge. This theory, however, seldom works out satisfactorily, and rarely ever gives the best results. A better practice is to move the drag at nearly right angles to the line of the road, causing the accumulating material, cut from the high points, to pass under the drag as it spans ruts and low places in the road surface.

With the road drag of ordinary design this cut and fill action is limited. To accomplish this result more perfectly, and at the same time decrease the labor of operation, the drag shown in the accompanying sketch was designed.

In use the drag is kept at nearly right angles to the line of the road. When the operator wishes to cut or scrape off hard high points he stands well forward on the top plank, thus forcing the forward steel blade somewhat deeper into the road surface. Whenever a surplus of material accumulates in front of the forward timber the operator puts sufficient weight on the rear end of the top plank to raise the forward timber just enough to allow the surplus material to gradually pass underneath. The rear timber, by reason of its tilted position, readily slides over the material thus thinly deposited, and also partially packs it. The top plank, used as sort of a lever to raise the forward timber by foot pressure, and the rear timber by hand are extremely useful when clearing the drag from large clods or other coarse material.

In actual use this form of drag has proved to be a decided improvement over those of the ordinary design. It can be made, at a moderate cost, in any wagon, plow or blacksmith shop, and is not patented.

M. E. CHAMBERLIN,
City Clerk and Engineer.

Montevideo, Minn.

Molasses as Road Material

A recent report from Sugarland, Texas, is to the effect that sugar manufacturers in parts of Texas and Louisiana are interested in experiments made by the United States government with molasses for road surfacing.

The United States Office of Public Roads has conducted these experiments, in which a mixture of black strap molasses and lime is applied to macadam on a short section of old macadam road beyond Chevy Chase Circle, near Washington, and upon the roads in the grounds of the Agricultural Department at Washington. At present, it is stated, the experience of the office with the method has been too limited for arrival at any definite conclusion as regards the merits of the construction. The experiments, have, however, led to the belief that the molasses and lime mixture can be considered only as a dust palliative or temporary binder, since, owing to the apparent solubility of the molasses in water, heavy rains have a marked leaching effect upon the treated road surface. It is the present intention of the office to conduct further experiments.

The particular interest in these experiments evinced in Texas is due to the fact that at Sugarland and other points where the sugar industry is carried on extensively, there are available large quantities of black strap molasses that can be purchased at very low prices. At present this grade of molasses is used extensively for horse and cattle feed. Another fact tending to enhance local interest in the experiments is that in most of the sandy districts of Texas there is a lack of good road material and if it is found that molasses can be used advantageously in those sections, much will have been done toward solving the problems of road building.

In this connection it should be noted that the use of molasses on roads has been tried before. During the summer of 1908, the Office of Public Roads conducted an experiment along similar lines at West Newton, Mass. In that work a concrete was made of broken stone mixed with a binder composed of quicklime, water, molasses

and oil. According to the official report on the experiment, "the binder was prepared in a large mortar box by first slaking 320 lbs. of quicklime with 108 gals. of water; as soon as the lime was completely slaked, 92 gals. of molasses was added and thoroughly mixed with it, after which 50 gals. of the semi-asphaltic oil was stirred in." While this preparation was hot, it was mixed with the graded stone at the rate of 18 gals. to every 1,310 lbs. of stone. The resulting concrete was then hauled to the road and laid as quickly as possible. The road built in this way is understood to have given satisfactory results.

State Good Roads Association in Connecticut

An organization known as the Connecticut Good Roads Association was formed at a meeting of men interested in highway improvement in various parts of the state of Connecticut, held in the Stratfield Hotel at Bridgeport, August 19.

A constitution was drawn up and adopted at the meeting and officers were elected. The constitution provides that the association shall be known as the Connecticut Good Roads Association, Incorporated. Its objects are the promotion of an organization consisting of associations, clubs and individuals interested in good roads, the securing of legislation governing the construction of public highways in Connecticut, and especially the encouragement and promotion of the construction and maintenance of permanent pavements on the trunk highways of the state.

The corporation is to be supported by the payment of dues and subscriptions by its members and is not to be conducted for profit. Individuals and clubs of not less than 25 members are eligible for membership. The charter will remain open until January 1, 1913. The constitution further provides that the general management of the policies of the association work, and the funds of the corporation shall be in the hands of a board of directors, composed of one director for each club or local organization affiliated, and one director for each 100 members or additional part thereof, over 40 for each affiliated organization, and one director for each 100 individual members or fraction over 40. The active executive work is vested in an executive board of not less than seven members, the president and chairman of the legal committee to be ex-officio members, and the remainder to be elected by the board of directors. Every member of the executive board must be a director of the association. The following officers were elected at the meeting: President, Gen. Henry A. Bishop, Bridgeport; Vice Presidents, Gen. Wallace T. Fenn, Hartford; George M. Eames, Bridgeport; Secretary, C. M. Robinson, New Haven; Treasurer, Philip Pond, New Haven. The following were chosen chairmen of committees: Legal, C. M. Robinson, New Haven; Finance, W. W. Holmes, Waterbury; Technical, Fred L. Ford, City Engineer of New Haven; Membership, F. H. Mason, New Haven; Publicity, J. M. Emerson, Ansonia. The executive board is composed of President Henry A. Bishop, C. M. Robinson, Chairman of the Legal Committee, Frank T. Staples of Bridgeport, H. P. Maxim of Hartford, Senator A. A. Platt of Waterbury and Don C. Seitz of Greenwich.

A meeting was held, August 2, at the Waldorf Hotel, Hamilton, Ont., in the interest of the construction of an improved highway between Hamilton and Toronto. W. S. Platt of Hamilton was chairman of the meeting, and the speakers included H. L. Frost, President of the Hamilton-Ontario Board of Trade; Mayor Lees, Hamilton, Ont.; Mayor Keller, Niagara Falls, N. Y.; Mayor Cole, Niagara Falls, Ont.; John Ira Platt, Hamilton, and Major Kennedy of the Ontario Good Roads Association. These men all spoke strongly in favor of the proposed new highway and outlined various plans and methods for its construction.

Convention of the American Road Builders' Association

Plans for the ninth annual convention of the American Road Builders' Association and American Good Roads Congress, which will be held in Music Hall, Cincinnati, O., December 3, 4, 5 and 6, are well under way. It is stated by those in charge of the arrangements that although it is as yet too early to announce the program, the proceedings will be conducted along lines similar to those followed last year at Rochester. As before, it is proposed to limit the formal papers to the consideration of questions of organization, construction and maintenance, and to arrange the program so that they will be followed by both formal discussions by previously selected speakers and informal discussions in which all may participate. A portion of the program will be again devoted to the consideration of the problems of contractors.

Governor Judson Harmon of Ohio has sent letters to the governors of the other states of the Union, indorsing the purposes of the American Road Builders' Association and requesting that delegates be appointed. Though the convention is still nearly three months away, some of these delegates have already been appointed. Governor Harmon's letter of invitation follows:

State of Ohio,
Executive Department.
Columbus, Ohio, August 15, 1912.

My dear Sir:—

A Congress of men officially employed or interested in the science of road building will be held at Cincinnati, Ohio, December 3, 4, 5 and 6, 1912. This congress is held in connection with the National Convention of the American Road Builders' Association.

I would respectfully request that you appoint three delegates-at-large to attend said convention.

This convention will be one of the most notable gatherings of its kind ever held in the United States. Attendant upon and taking part in the deliberations will be men of national reputation in expert road making, and who have made the science of road building a study both from an economic standpoint and under the most improved methods. The value of their experience and education will be of incalculable benefit to all those who may attend the convention.

This great question of road improvement is asserting itself as never before in the history of our country, and has become, thereby, one of the paramount issues of the day. The sentiment for better roads has grown very rapidly, and the Twentieth Century finds inaugurated successfully in a majority of the states of the Union an intelligent and helpful plan under which to place highway improvement within the reach of all. Every day the interest for the betterment of highways is growing in the minds of all of the people of our country.

The principal reason for calling this convention is to bring together the brightest minds and the largest and best experience to be found in the United States on this subject, with the object in view of disseminating the knowledge thus gained throughout the length and breadth of the land.

As Governor of the State of Ohio, I am only too happy to second the efforts of the gentlemen having charge of this great convention by anything I can do leading up to as large an attendance as possible. If the purposes of this convention are agreeable to you, I respectfully ask that you appoint three delegates and send their names to E. L. Powers, Secretary of the American Road Builders' Association, 150 Nassau Street, New York City, so that they may be enrolled on the list of delegates.

Thanking you in advance, I remain,

Very respectfully yours,

JUDSON HARMON, Governor.

As at the last three conventions of the association, there will be held in conjunction with the sessions an exhibition of road building machinery and materials. These exhibits will be displayed in the north wing of Music Hall, the same building in which the sessions will be held, and where there is available over 50,000 sq. ft. of space. The hall has been conveniently arranged for the use of exhibitors and is advantageously situated as regards access and convenience in bringing in exhibits. The previous exhibitions have proved very popular features of the conventions

and applications for space at Cincinnati, received more than three months in advance of the convention, indicate an exhibition this year far exceeding in extent and value those of other years.

An especially interesting and instructive feature this year will be the exhibits by the state highway departments of the different states and by a number of the leading cities. Plans for this have long been under consideration and it is expected by those in charge that the displays made by the states and municipalities will be of great interest and value to the delegates. The manner in which state highway and street officials have received the suggestion gives promise of a large and comprehensive exhibit.

Cincinnati, the convention city, possesses many advantages as a meeting place both as regards accessibility and facilities. Every effort will be made by the city to co-operate with the American Road Builders' Association in making the ninth convention more successful than even the highly satisfactory meetings that have preceded it.

The Atlantic City Road Congress

As announced in the issue of June 15, the road congress promoted by the American Association for Highway Improvement and allied organizations will be held at Atlantic City, N. J., Sept. 30-Oct. 5. Although this association held a convention at Richmond in November of last year, the coming meeting will be the first meeting of its kind to be held jointly by the American Association for Highway Improvement, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers, and has been officially named the First American Road Congress.

The congress is to be divided into three sections, each taking up two days. The first two days will be assigned to road users and the proceedings will be in charge of the American Automobile Association. The proceedings of the next two days will be devoted to questions of legislation, finance and economics, and will be conducted by the American Association for Highway Improvement. The last two days will be given up to engineers for the discussion of construction and maintenance and to the various associations for the formulation of plans for future activity.

It is proposed to divide the construction and maintenance section into 9 sub-sections, which, in turn, will each cover one or more questions. The tentative program of this section is as follows, discussion being provided for on each question:

Construction and Maintenance Section

Sub-section A.—Location and grades.

Question 1.—Surveys.

Question 2.—New location and relocation.

Question 3.—Grades: tractive resistances of various surfaces, relation to traffic, etc.

Sub-section B.—Foundation and drainage.

Question 4.—Fundamental considerations.

Sub-section C.—Road surfaces.

Question 5.—Earth, sand-clay and similar materials.

Question 6.—Gravel and stone—qualities, tests and selection.

Question 7.—Bituminous materials, including tars, asphalts and oils—qualities and tests.

Question 8.—Construction of gravel and water bound macadam surfaces.

Question 9.—Construction of surfaces with bituminous materials.

Question 10.—Brick roads—materials, construction and maintenance.

Question 11.—Concrete roads—materials, construction and maintenance.

Question 12.—Experimental surfaces and special surfaces applicable under special conditions.

Sub-section D.—Maintenance (methods rather than administrative system).

Question 13.—Earth, sand-clay and gravel roads.

Question 14.—Water bound macadam.

Question 15.—Bituminous surfaces.

Sub-section E.—Bridges.

Question 16.—Highway bridges.

A.—Highway culverts.

Sub-section F.—Streets and parks in towns and cities.

Question 17.—Street paving.

Question 18.—Park roads.

Sub-section G.—Adaptation of surfaces to traffic requirements.

Question 19.—Paper.

Sub-section H.—Roadsides.

Question 20.—Paper.

Sub-section I.

Question 21.—Road and street contracts (essentials and lines of improvement).

Question 22.—The relation of the contractor and the public officials.

The congress is to be held on the Million Dollar Pier, where space has been secured for the road machinery and materials and other exhibits that will be shown. Space is to be reserved for the highway departments of the various states, and it is expected that this step will result in some interesting exhibits.

It is announced that both President Taft and Governor Wilson have agreed to address the congress. President Taft is Honorary President of the congress and Logan Waller Page, President of the American Association for Highway Improvement, is the active president. Col. E. A. Stevens, State Highway Commissioner of New Jersey, is chairman of the construction and maintenance section.

Program of Questions and Communications for the Third International Road Congress

A complete general program of the proceedings of the Third International Road Congress, to be held at London next June, and a program of questions and communications to be taken up at the sessions, have recently been issued. The general program is practically the same as that published in the issue of May 25. The program of questions and communications is presented here.

The proceedings are divided into two sections, the first dealing with construction and maintenance, and the second with traffic and administration. Each section is further divided into two sub-sections and in each case the two sub-sections, sitting together, will discuss questions common to both. The two subdivisions of the first section, sub-sections A and B, cover the construction and maintenance of roads outside of towns and the construction and maintenance of roads in towns, respectively. Sub-sections C and D of the second section deal with traffic and vehicles and with administration, finance and statistics. The program in its entirety follows:

FIRST SECTION

Construction and Maintenance

Questions Common to Sub-Sections A and B

1st Question.—Planning of New Streets and Roads.

(a) Old towns: 1. in central districts; 2. in the suburbs.

(b) In new towns.

(c) In the rural areas.

Importance of directness of route—Alignment. — Longitudinal and cross sections—Curves—Analysis of practical and economic value of width under various circumstances—Steps necessary to insure the security of and regularity of the various currents of circulation—Whether local or through traffic—Reconciliation of requirements of each of the former—By-pass roads avoiding towns and

villages—Treatment of crossings and corners—Arrangement of metalled carriageways, footpaths, special tracks, taking into account the presence or absence of tramways, of bicyclists, and of the various methods of circulation generally in use.

2nd Question.—Types of Surfacing to Be Adopted on Bridges, Viaducts, Etc. (Fixed or Movable Bridges, Suspension Bridges, Railway Bridges.)

Cost—Wear—Durability of various surfacings—Methods of maintenance and repair, or remaking.

Communications Common to Sub-Sections A and B

Communication 1.—Improvements Adopted Since the Second Congress in Machinery Used in the Construction and Maintenance of Macadamized Roads.

Sweepers—Water Carts—Machine Rammers—Light rollers—Mixers—Stone driers and heaters—Transport wagons.

Communication 2.—Tests of Materials Used in the Construction of Macadamized Roads.

Laboratory and practical tests—Testing machines and appliances—Comparative value of various tests—Statistics of results obtained.

Sub-Section A

3rd Question.—Construction of Macadamized Roads Bound with Tarry, Bituminous or Asphaltic Materials.

Which are the best methods and materials for the construction in open country of macadamized roads bound with tarry, bituminous or asphaltic materials?

(Note: Reports sent in under this heading must include all or some of the following heads, and furnish as much as possible, data obtained from practical experience and more especially on the results obtained in the various trials that have taken place since the Second Congress.)

1. Foundations and drainage.
2. Sizes and shapes of broken stone for bituminous bound surface crust.
3. Use of partially worn materials in bituminous bound surface crust.
4. Thickness and composition of the strength crust and of the super or wearing crust under different conditions.
5. Life of surface crust under different conditions of traffic, weather, subsoil, etc.
6. Relative importance of patching, repairs and periodical renewals of surface crust.
7. Extent of wear permissible before renewal of surface coating.
8. Measurement of wear and appliances used for this purpose.
9. Various methods of bituminous treatment.
 - (a) Mixing methods: In factories; on the spot.
 - (b) Grouting methods.
 - (c) Carpeting methods.
 - (d) Other methods.
10. Relative advantages and use of tar, tarry compounds, asphalt, bitumen and other materials.
11. Tests and chemical analyses of tarry, bituminous and asphaltic compounds.
12. Climatic effects causing slipperiness of the roadway—Remedies.
13. Effect on public health, fish life or vegetation.
14. Specifications of the methods of construction.
15. Cost data.
16. Cleansing and watering.

Communication 3.—Construction of Water Bound Macadamized Roads.

Which are the best methods of construction and maintenance for water bound macadamized roads, used in country or suburban districts since the Second Congress?

(Note: Reports sent in under this heading must include all or some of the following heads, and furnish as far as possible, data obtained from practical experience.)

1. Foundations and drainage.
2. Choice of materials.
3. Sizes and shapes of broken stone and of chippings.
4. Use of partially worn materials in the formation of the surface crust.
5. Thickness and composition of the strength crust under different conditions.
6. Life of the surface crust under different conditions of traffic, weather, subsoil, etc.
7. Relative importance of patching, repairs and periodical renewals—Methods of resurfacing.
8. Specifications of methods of construction.
9. Cost data.
10. Cleansing and watering.

Communication 4.—Technical and Economic Study of the Comparative Advantages of Different Types of Roads.

Under what circumstances and conditions of traffic are the following types of road preferable from the point of view of the traffic and from that of economy?

1. Stone setts.
2. Metaled roads bound with tar, pitch, asphalt or bitumen by
 - (a) Mixing or grouting methods.
 - (b) Carpeting methods.
 - (c) Other methods.
3. Metaled roads—water bound.

Sub-Section B

4th Question.—Wood Paving.

Choice of wood—Methods in use—Resistance to wear—Methods of maintenance—Cost—Cleansing and watering.

Communication 5.—Various Types of Stone Paving in Use.

Advantages of unification.

SECOND SECTION

Traffic and Administration

Questions Common to Sub-Sections C and D

5th Question.—Methods of Lighting.

- (a) The public highway.
- (b) Vehicles.

Sub-Section C

6th Question.—Observations Noted Since 1908 as to the Various Causes of Wear and Deterioration of Roadways.

1. In towns.
2. In suburban districts.
3. In open country.

Effects produced by sun, frost, snow, or any variations of temperature—Effects due to the circulation of self-propelled or horse-drawn vehicles—Mixture of fast and slow traffic, aggregate volume and density in busy hours—Effect of speed, weight, construction, position of the exhaust, width and diameter of wheels, various kinds of tires, shoeing of horses.

7th Question.—Regulations for Fast and Slow Traffic on Roads.

Conditions to be observed with a view to the safety of the public—Precautions to be taken during progress of repairs—Regulations for the use of the roads during frost and thaw—Positions of lamp posts and other obstructions.

Communication 6.—Direction and Distance Sign Posts.

Communication 7.—Development Since the Second Congress of Self-Propelled Public Service Vehicles.

Dimensions—Weight—Capacity—Cost of upkeep—Mileage worked.

Sub-Section D

8th Question.—Authorities in Charge of the Construction and Maintenance of Roads; Functions of Central Authorities and Local Authorities.

Advantages and disadvantages of centralization and decentralization—Area and organization for construction, maintenance, repairs—Staff employed, its composition, and whence drawn—Systems of inspection.

9th Question.—Finance of the Construction and Upkeep of Roads; Provision of Revenues.

Special taxes—On what classes of persons, vehicles, or objects would the taxes weigh? Basis on which the inci-

dence of taxation should be founded—Borrowing for road construction and renewals—Methods of repayment.

Communication 8.—Qualifications of Engineers and Surveyors in Charge of the Construction and Maintenance of Roads; Wages and Conditions of Service of Foremen and Roadmen.

Communication 9.—Statistics of Cost of Construction and Maintenance.

Methods of keeping accounts—Repartition among the various authorities, boards, etc., interested—Comparative statistics per unit of population, mileage, traffic, etc.

Communication 10.—Terminology Adopted or to Be Adopted in Each Country Relating to Road Construction and Maintenance.

Meeting of the Massachusetts Highway Association

The quarterly meeting and ladies' day of the Massachusetts Highway Association was held on Thursday, August 15, 1912.

The meeting took the form of an outing to many of the historic points in the suburbs of Boston, and particularly those in the towns of Lexington and Concord. Thirty-seven automobiles were furnished by members and friends of the association. The party numbered about 150, and assembled at the corner of Beacon and Arlington streets. Starting at 10:15 a. m., a trip was made through Cambridge and Arlington, passing over the route followed by Paul Revere in his midnight ride to Lexington. Leaving Lexington, the party passed on to Concord, and from there went to the bridge where the first battle between the American patriots and the British soldiery was fought. Sleepy Hollow Cemetery and Lexington Park were also visited. Dinner was served at Lexington Park. A brief business meeting was held at this place, eight applications for membership being received and acted upon favorably, thereby increasing the membership to 273.

Mexican Government Restoring El Camino Real

The first step in the plans of the Mexican federal government in the construction of an extensive system of good roads throughout the country, is the rehabilitating of El Camino Real, or the main highway which runs between the city of Mexico and the port of San Blas on the Pacific Coast with a branch up the coast to Guaymas. The federal government has already commenced the work and will be assisted by the different state governments.

The main highway has a length of about 700 miles and is a relic of the system of public works established during the days of the Spanish control of Mexico. It was originally laid out and constructed more than 300 years ago, at great expense, under the direction of the government of Spain. Notwithstanding the length of time which has elapsed since the road's construction, many sections of it are still in good condition. Many stretches were hewed out of solid rock, and other parts were paved with cobblestones, which were carried for long distances upon the backs of Indians forced into service in building the road.

Its reconstruction involves the building of a number of new bridges. Government engineers have been employed for several months making surveys and estimates of the portions of the highway that require restoration.

The branch road that runs up the Pacific coast to Guaymas is about 600 miles long. The division between Guadalupe and Tepic is through one of the most picturesque sections of the Sierra Madres, and is still in daily use, being the principal route of travel between Central Mexico and the Pacific Coast region.

A Tractor with Unique Driving Mechanism

A tractor which, while suited to the ordinary uses of such machines, is especially designed for operation in soft, yielding soil, is shown in the accompanying illustration. The tractor is shown hauling two graders on road work in Cissna Park, Iroquois County, Ill. The photograph from which the illustration was made was taken last month while the outfit was being used to grade the road and at the same time cut a 3-ft. ditch at the side.

The "Holt Caterpillar Tractor," as the machine is known, is a gasoline traction engine equipped with the peculiar driving mechanism from which it is named. This consists of a steel track in the form of a belt running over two sprockets, of which the rear one is the driver, with the weight of the tractor carried on four-wheeled trucks resting on the inside of the track. The rear sprocket on each side is driven by a chain from a sprocket on the countershaft, the two sides being driven separately so as to permit steering the machine by driving on one side only. The sprocket engages with the inner side of the track, picking it up at the rear and carrying it forward around the front sprocket and down to the ground. The tracks are made in three widths, 16-in., 24-in., and 30-in. The 16-in. track gives a supporting area of 2,000 sq. ins., producing a pressure on the ground of 8 lbs. per sq. in. The areas with the 24-in. and 30-in. tracks are 3,000 and 3,600 sq. ins., respectively, and the corresponding pressures per sq. in., 5 1-3 and 4 1/2 lbs. Track shoes for the 16-in. track are provided with smooth cleats, those for the 24-in. track with diamond pointed lugs and those for the 30-in. track with angle cleats as shown in the illustration.

Power is supplied by a 4-cylinder 4-cycle motor rated at 45 B. HP. at 550 r.p.m. The bore is 6 1/2 ins. and the stroke 8 ins. The motor may be run on gasoline, naphtha, distillate or kerosene. A water cooling system is employed, the circulation being obtained by a centrifugal pump passing the water through a radiator consisting of 132 vertical spiral fin copper tubes cooled by means of a 30-in. suction fan.

The fly wheel, showing just back of the motor, is on the motor crank shaft and to it, at the rear, is attached the master clutch controlling all of the shafting and gearing back of the motor. This clutch is of the multiple disk type. Extending from the clutch to the transmission case is the clutch shaft extension which carries the master clutch shifter and the master clutch brake and terminates

in the forward bevel gear in the transmission case. This gear is keyed to the clutch shaft and drives a gear at right angles, which is keyed to the power pulley shaft extending out on the left side of the tractor. This, in turn, drives the rear bevel gear, in line with the forward gear, which turns freely on the bevel pinion or tail shaft. The transmission case also contains a jaw clutch placed between the forward and rear bevel gears to control the power pulley and reverse motions, and so arranged that when the tractor is drawing a load on the forward motion none of the gears in the transmission case is transmitting power. On the tail shaft is a 13-tooth pinion which engages with a 106-tooth gear mounted on a countershaft placed transversely. On the countershaft are two sprockets, connected by chain drives to the sprockets on the main drive shaft which engage the tracks.

The caterpillar tractor is the result of experiments to design a machine suitable for use on plowed fields, loose sand, prairies and in all places where the ground is not firm. It is manufactured by the Holt Caterpillar Co., Inc., of Peoria, Ill.

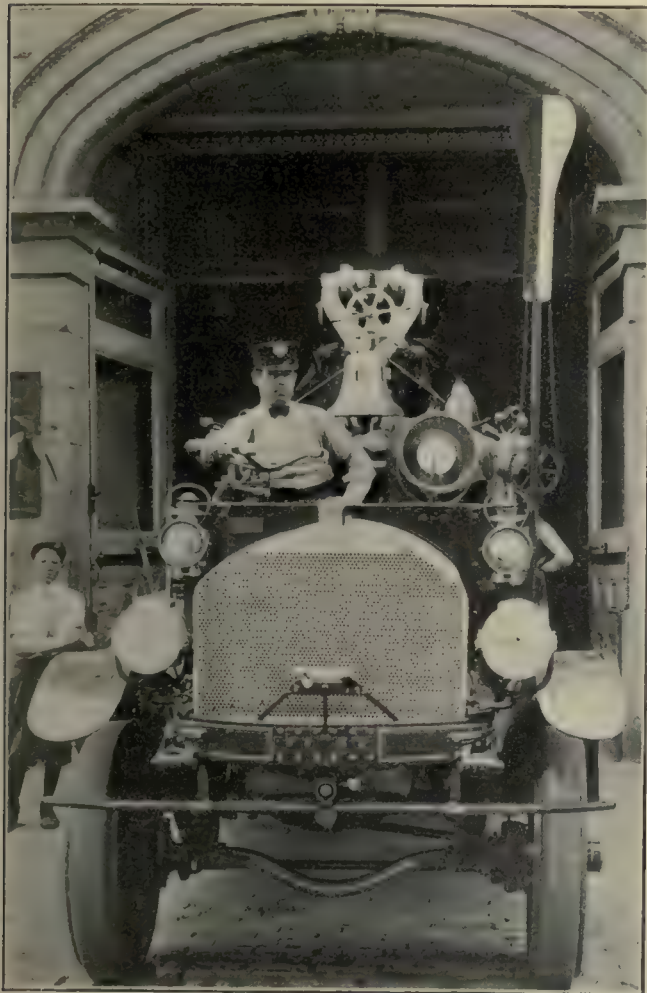
Attachment for Fire Apparatus to Aid in Regulating Traffic

The accompanying illustration shows a device which has recently been tried on one of the high-pressure automobile hose wagons of the Baltimore (Md.) Fire Department for facilitating the clearing of the street in advance of the apparatus when on its way to a fire.

Ever since the introduction of the silent alarm system in Baltimore, traffic policemen have been confronted with the problem of determining in which direction approaching fire apparatus would go. The policeman, without knowledge of the location of the fire, was at a loss to know whether the apparatus would continue along the street or whether it would turn at some particular intersection, and in the congested section of the city the task of keeping the streets clear was rendered difficult. In order to solve the problem, one of the engineers of the fire department invented an apparatus, which consists of a red and white signal, resembling a semaphore, which is attached at the front of a truck, as shown in the illustration. The arm is so arranged that it may be lowered either to the left or to the right, and is operated by the man who sits beside the driver of the machine and operates the alarm signal. If the machine is to continue



"CATERPILLAR" TRACTOR HAULING ROAD GRADERS IN IROQUOIS COUNTY, ILLINOIS.



BALTIMORE HOSE WAGON WITH SIGNAL DEVICE FOR INDICATING TURNS TO BE MADE.

straight along the street the signal is left in its normal upright position, while if it is proposed to turn to the left or to the right the arm is lowered to the side to which the turn is to be made. As a policeman can see the signal at the distance of an entire city block, he has ample time when he sees the apparatus approaching to clear the way in the necessary direction.

It is stated that although the signal system has been in use but a few weeks it has proven so satisfactory that all of the apparatus will be equipped with it.

A Report on the Public Roads of Georgia

The Geological Survey of Georgia, through S. W. McCallie, State Geologist, has recently issued a report on the public roads of Georgia, which is designated as Bulletin No. 28 of the survey. The present report is the third of its kind which has been published by the Geological Survey, the first having been issued in 1901 and the second in 1910. In the prefatory note it is stated that it is a matter of regret that the statistical data which were collected by correspondence with county road officials had to be estimated in many cases, but that they are thought to be sufficiently accurate to give a fairly trustworthy idea of the general condition of the public roads in the state. It is further stated that the mileage and cost of sand-clay roads cannot be relied upon in some cases, since the number of miles constructed multiplied by the given cost per mile is greater than the total amount of money expended.

The report consists of a brief statement regarding mileages and expenditures and an extensive table giving data

on road work in each of the counties of the state. The statement preceding the table is as follows:

The statistical table of this report shows that the estimated public road mileage of the state of Georgia in 1911 was 83,986, which is an increase of 1,704 miles over the road mileage of 1909, the date of the last statistical road data published by this Department. The table also shows that during last year there were constructed in the state 35 miles of macadam road, 235 miles of road surfaced with gravel and chert, and 4,077 miles of road surfaced with sand-clay mixtures. These figures show that within the last two years there has been very rapid progress made in improving the roads of the state. Especially has this been true in regard to the construction of gravel and chert roads and sand-clay roads. In 1909, or only two years ago, the statistical road data showed that up to that date only 502 miles of gravel and chert roads and 3,421 miles of sand-clay roads had been constructed, whereas, in 1911, there were constructed 235 miles of gravel and chert road and 4,077 miles of sand-clay road. In other words, the total number of miles of gravel and chert roads constructed last year was nearly one-half the mileage of these roads previously constructed, and the sand-clay roads constructed exceeded the mileage of this class of roads previously constructed by 656 miles.

Of the 146 counties of the state 116 employ convicts and 30 use statute or hired labor, the total number of convicts employed being 4,744.

The expenditures on public roads and bridges in 1911 were \$659,002 commutation tax and \$1,770,697 property tax, making a total money expenditure of \$2,504,699. To this sum should be added \$1,623,200, an estimated money value of convicts furnished by the state, together with the value of statute labor of those counties not using convicts and those using both convicts and statute labor. This makes a grand total of road expenditure last year of \$4,127,899.

In comparing the total road mileage of the state with the total estimated road expenditures it will be seen that each mile of public road cost last year \$49.15, or \$1.58 per inhabitant, based on the census of 1910.

The accompanying table, compiled from the table in the report, gives only the totals for the entire state. It should be noted, also, that some of the items in the original table, such, for instance, as the table for average costs per mile and others not susceptible of totaling, have been omitted.

PUBLIC ROAD DATA OF GEORGIA COLLECTED BY THE STATE GEOLOGICAL SURVEY IN COOPERATION WITH THE STATE PRISON COMMISSION.

Road Mileage and Bridges:

Total of all public roads.....	83,986
Improved Roads and Bridges:	
Surfaced with stone.....	35
Surfaced with gravel or chert.....	235
Surfaced with sand-clay mixtures or "top soil"....	4,077
Surfaced with shells, cinders or slag.....	7
No. of steel, iron, or cement bridges.....	324

Labor Used in Road Improvement:

No. of convicts	4,744
Number of Mules on Public Roads.....	3,361
Value of Mules	\$760,975
Value of Road Machinery	\$356,712
Expenditures for Road Improvement:	
Commutation tax	\$659,002
Property tax for roads and bridges.....	\$1,770,697
Total Expenditures for Roads and Bridges.....	\$2,504,699

Experimental Work by the Ohio State Highway Department

The construction of an experimental road, consisting of a number of sections in each of which a different kind of surfacing will be tried out, is to be undertaken by the State Highway Department of Ohio.

Chillicothe Pike, in Franklin County, has been selected for the work, and the pavements put down will include brick, concrete and macadam. The brick sections will be built of bricks of various percentages of abrasion and filled with different fillers. The concrete work will include sections of plain concrete and of concrete surfaced with bituminous materials. The macadam sections will be of water bound and treated macadam and slag.

Details of the work are not available at present, but will be given out later.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

Contracts have recently been let in the city of Waco, Tex., for \$150,000 worth of street paving. Bituminous concrete and creosoted pine blocks will be the materials used.

A meeting of the taxpayers of Marshall County, Tex., has been called by the Marshall County Good Roads Association, to be held at Brownsville, Sept. 14. The purpose of the meeting will be to perfect a permanent organization, to ratify the constitution and by-laws prepared at a previous meeting, and to hold an annual election of officers.

Plans have been completed for the proposed \$275,000 bridge, which will cross Rock Creek, at Q St., Washington, D. C., and condemnations are being made of the land for the approach to the structure. Work on construction will begin as soon as the condemnation proceedings are completed. Plans for the bridge were drawn in the office of T. C. J. Bailey, Engineer of Bridges of the District.

E. J. Watson, Commissioner of the State Department of Agriculture, Commerce and Industries, of South Carolina, has compiled and published, under the auspices of the department, a route book covering the main public highways of South Carolina. The booklet contains 21 pages, besides the covers, and comprises maps, directions, automobile and motor vehicle laws, and other general information regarding the highways of the state and their use. A schedule of traffic regulations of the city of Columbia is one of the features of the publication.

The District Commission of Sedalia, Mo., Twelve Mile Road District, on August 24, awarded contracts for the construction of rock roads radiating from Sedalia, at a cost of \$150,000.

Tentative plans are under way for the building of an automobile road from Coleman, Miss., to Birmingham, Ala. Another movement is being promoted for building another highway from Columbus, Miss., to Tuscaloosa, Ala., along the line of the Mobile & Ohio Railroad, a distance of 60 miles. These two highways if constructed will make a total of about 130 miles of new road radiating out of Columbus.

Preparations for the Glidden or National Reliability Tour of the A. A. A., which will start from Detroit, Mich., October 7, and finish in New Orleans, La., October 19, are practically completed. The distance is something over 1,600 miles, and the average daily run will be about 135 miles. Considerable work has been done on the roads along the route, and it is expected that the general standard of quality of the roads will be of a higher average than during any of the six previous tours.

Figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, show that the exports of automobiles to foreign countries in the fiscal year 1912 were valued at \$21,500,000, and of parts thereof, including tires, \$6,750,000. If this were added to the shipments to Hawaii and Porto Rico, the total exports from the United States of American automobiles would reach a value of \$30,000,000. The value of automobiles and parts sent to Porto Rico is nearly a million dollars, and to Hawaii a little over a million dollars. The average value of the machines exported to foreign countries was slightly less than one thousand dollars each.

The contract for removing the so-called Snyder Bridge at Douglas, Neb., the cost of which was to have been \$7,000, has been cancelled by the Board of County Commissioners of Otoe County. The Commissioners had been informed that the course of the river had been changed so that the old bridge was left on dry land, and the contract, which called for the removal of the bridge so as to span the new channel, was awarded to the Western Bridge & Construction Co. Later it developed that the board had been misinformed. The river's course had been changed and the new bridge was needed, but 12 ft. of water stood in the old channel, and upon the removal of the old bridge a new one would have to be built. The Western Bridge & Construction Co. will be paid for the work so far done on the removal of the old bridge.

Personal Notes

John McMillan has been appointed City Engineer of South Pasadena, Cal., succeeding B. Dupuy.

Marsden Manson, M. Am. Soc. C. E., has resigned as City Engineer of San Francisco, Cal., on account of protracted illness. Mr. Marsden has been connected with the public service of San Francisco for many years.

An election will be held Oct. 1 in Cameron County, Texas, to vote on a bond issue of \$250,000 for the construction of macadamized roads throughout the county.

William F. Williams, M. Am. Soc. C. E., for twenty years City Engineer of New Bedford, Mass., has been appointed Chief Engineer of the Massachusetts Board of Harbor and Land Commissioners.

Paul McCloud, Division Engineer for the State Commission of Highways of New York State, with headquarters at Albany, has been appointed Chief Engineer, at a salary of \$5,000 per annum, succeeding Harry P. Willis, who recently resigned.

Trade Notes

Harry Bros. Co. of Newport, Ky., manufacturers of the corrugated metal culverts, is publishing a periodical known as the "Road Supervisor." The issue for August has been forwarded to "Good Roads," and contains considerable that is of interest to road builders.

The Independent Powder Co., of Joplin, Mo., has issued an elaborately compiled booklet on "Dynamite, the Various Kinds, When, Where and How to Use Them." The booklet contains 156 pages and covers, and fulfills the provisions of its title in a very thorough manner. It is profusely illustrated, some of the half-tones showing explosions, being of a striking character.

Miss Eva Cressy, daughter of Walter Cressy, a leading road contractor and manufacturer of the Pillsbury Sprayer, is said to be the only woman in New England actively engaged in highway construction. A stretch of road in Massachusetts was recently built under her direction, and is said to be one of the best built pieces of road in the state. Thirty-five men were engaged in its construction, the work of the entire gang being under the direct supervision of Miss Cressy.

CONTRACT NEWS

CONTRACTS PENDING

ROADS AND STREETS.

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9-17	Toledo, O., bridge constn.....	8-31
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9-23	Amsterdam, O., bonds.....	9-7

ROADS AND STREETS

Bids Asked and Prospective Work.

Gadsden, Ala.—It is stated that a link of the road between Gadsden and Birmingham in Etowah Co. will be improved.

El Segundo, Cal.—The El Segundo Land & Improvement Co. has set aside \$10,000 for street work and that and \$15,000 more will be expended on the streets. The company has headquarters in the I. W. Hellman Bldg., Los Angeles.

Fresno, Cal.—The Bd. of Trustees has ordered the construction of asphalt pavements on Stanislaus St. from I to O Sts., O St. from Stanislaus to Inyo St., and Blackstone Ave. from O to Belmont Ave., a total of a mile and a half.

San Diego, Cal.—The City Attorney has advised the Council that bids must be readvertised for improving India St., between H and Winder Sts., the contract for which was let last week to Ford & Stout of Los Angeles at about \$96,000.

San Francisco, Cal.—The Bd. of Pub. Works has granted permission to property owners to perform street work under private contracts at the following locations: Falcon Ave., between Mono and Caselli Sts.; Falcon Ave., between Danvers and Mono Sts.; Balboa St., between Nineteenth and Twentieth Aves.; Thirty-ninth Ave., between Cabrillo and Fulton Sts.; Duncan St., between San Jose Ave. and Guerrero St.

Stockton, Cal.—Bids have been advertised for 150 ft. of concrete bulkhead on pile foundation. Engineer's estimate, \$7,000.

Bids have been advertised for paving two blocks, as follows: 38,000 sq. ft. two inches of asphaltic concrete on six-inch concrete foundation. Engr's estimate, 20 cents per sq. ft. Walter G. Hunter, City Engr.

Venice, Cal.—The City Engr. has completed estimates for the cost of construction of an automobile road from the Los Angeles Co. line through the city of Venice, the amount being \$25,000.

Moscow, Id.—Bids for paving, grading, curbing and storm sewer, estimated by the city engineer to cost about \$180,000, covering about 30 blocks in the business section of Moscow, are to be opened Sept. 14.

Champaign, Ill.—The Champaign City Council has passed an ordinance for paving North Fifth St. and advanced the ordinance for North Nell St., so that it will come up for passage at the next meeting.

Decatur, Ill.—According to reports, West Grand Ave. will be improved next year from Water St. west to the school house, about one mile west of the city.

E. St. Louis, Ill.—The Bd. of Loc. Imps. of East St. Louis, has approved specifications for the improvement of two streets in the residence part of the city that will cost \$38,724.

At a recent meeting of the East St. Louis Bd. of Loc. Imps. the improvement of 15th St., from Summit to St. Clair aves., was authorized.

Peoria, Ill.—Adams St. is to be paved with creosote blocks from Oak to Cedar Sts. Windom St. will be paved from Bourland to Elmwood Aves.

Rockford, Ill.—Approval has been given an ordinance to macadamize Summit St., the estimated cost being \$1,370.

Indianapolis, Ind.—The Bd. of Pub. Wks. has ordered City Engr. Klausmann to prepare plans for the paving of Jefferson Ave. between Washington and Michigan Sts.

Washington, Ind.—A declaratory resolution for the improvement of Flora St. with concrete curb and gutters and concrete sidewalks has been adopted.

Des Moines, Ia.—The City Council has passed a resolution to pave Grand Ave. from the east line of 56th St. to the east line of the Des Moines city railway right-of-way.

Shreveport, La.—Bids will be received by the Police Jury of Caddo Parish, until Sept. 12, for grading and surfacing with gravel or broken stone five miles of the Hart's Island road. J. T. Bullen is Parish Engineer.

Southern Ave. will be paved with brick.

Baltimore, Md.—The state roads Comn. contemplates building about three-quarters of a mile of macadam roadway along the Baltimore-Washington boulevard, from Main St., Laurel, to Crow Run.

Duluth, Minn.—The proper city officers were directed to draw an order for \$10,000 on the street maintenance and repair funds in part payment of the city's share of the cost of paving West Michigan-St. between Eighth and Twelfth Aves.

St. Paul, Minn.—The Bd. of Pub. Works has decided to pave Dale and Arcade Sts. \$75,000 will be expended. Address Clerk of the Bd.

Chillicothe, Mo.—The Council is planning to pave several streets. Address City Clerk.

Kansas City, Mo.—The Bd. of Pub. Works has ordered the City Engr. to start proceedings for the paving of Fifth St., from Wyandotte to Bluff St. at once.

Margate City, N. J.—Sealed bids will be received by the Bd. of Comrs. of Margate City, at the Chambers of the Comrs., City Hall, at a meeting to be held at 4 p. m., Sept. 9, for paving the south side of Atlantic Ave., between Cedar Grove Ave. and Mansfield Ave. with bituminous macadam and maintaining same for five years. Estimated quantities, 5,576 sq. yds. of bituminous macadam, exclusive of concrete foundation; 5,576 sq. yds. of six-in. concrete foundation, including excavation or filling; 475 sq. yds. concrete gutters, complete; 2,686 lin. ft. headers, set. Address A. B. Repetto, City Clerk.

Newark, N. J.—Ordinances have been approved providing for the following street work: Paving Fourth St., between Park and Sixth Aves., with brick pavement on a six-in. concrete foundation; paving Gold St. from Blum St. to Jacob St. with brick on a six-in. concrete foundation; paving Rose Ter. between Chadwick Ave. and South Tenth St. with brick on a six-in. concrete foundation. H. B. O'Connell is Pres. of the Bd. of St. and Water Comrs.

Fargo, N. D.—Sealed bids will be received until Sept. 9 for the paving and curbing of Seventh Ave. South from a line 800 ft. east of the east line of Fourth St. South to a line 1,000 ft. east of the east line of Fourth St. South in paving district No. 8. A. R. Watkins, City Aud.

Alliance, O.—An ordinance was passed determining to proceed with the improvement of Ridgewood Ave. from south line of State St. to South corporation line by grading, draining, curbing and paving with brick block.

An ordinance was passed determining to proceed with the improvement of North Walnut Ave. between Mahoning River Bridge and North Corporation line by grading, curbing and paving.

Bellaire, O.—An ordinance was passed determining to proceed with the improve-

ment of Franklin St. from 33d St. to Central Ave., by grading, etc.

An ordinance was passed determining to proceed with the improvement of 44th St. from Franklin St. to Pine Alley and Pine Alley from 44th St. to 45th St. by grading and paving.

Bryan, O.—An ordinance was passed determining to proceed with the improvement of Center St. from the west line of Beech St. to the west corporation line, by paving, curbing and draining.

An ordinance was passed determining to proceed with the improvement of West High St. from the west side of alley between Beech St. and Portland St. to the west corporation line by curbing, paving and draining.

An ordinance was passed determining to proceed with the improvement of Mulberry St., from the east line of Main St. to the west line of Union St. by paving, curbing and draining the same.

Canton, O.—Sealed bids will be received up to Sept. 13 for the furnishing of all necessary labor and material for the construction of an improved roadway, known as the North Industry-Howenstine Rd. Improvement. J. H. McConnell is Aud.

Chillicothe, O.—Bids will be received Sept. 9 for all labor necessary to construct the improvement known as the Owl Creek Rd. Address Robt. W. Alexander, Ross Co. Aud.

Cincinnati, O.—Sealed proposals will be received until Sept. 10 for the improvement of Charlotte St., from Baymiller St. to Linn St., by paving the roadway with asphalt.

Sealed proposals will be received until Sept. 10 for the improvement of Highland Ave. from Melish Ave. to Goodman St. by grading and paving.

Sealed proposals will be received until Sept. 10, for the improvement of Depot St. from Gest St. to Kelso St. by paving the roadway with granite blocks.

Sealed proposals will be received until Sept. 10 for the improvement of Isabelle St. from the north end of the present improvement, by grading and paving.

Sealed proposals will be received until Sept. 10, for the improvement of East Eighth Ave. by grading and paving.

Sealed proposals will be received until Sept. 10 for the improvement of Ada St. from Ravine St. to Flora St. by grading.

Sealed proposals will be received until Sept. 10 for the improvement of McMakin St. from Jo Williams St. to Delaney St. by grading and constructing the necessary drains and inlets. For information on all of the above work, address V. T. Price, Dir. of Pub. Service.

Newark, O.—An ordinance was passed determining to proceed with the improvement of Buckingham St. from Granville St. to Hoover St. by paving and curbing the roadway thereof.

Toledo, O.—Bids will be received Sept. 24 for furnishing materials and labor for the improvement by grading, draining and macadamizing a county road known as the Adams and Washington Rd., Oregon Twp.; Address Chas. J. Sanzenbacher, Lucas Co. Aud.

An ordinance was passed determining to proceed with the improvement of Redwood Ave., from Bowman St. to Congress St. by grading and paving.

West Mansfield, O.—Sealed proposals will be received at the office of the Clerk, until Sept. 27, for the purchase of Special Assessment St. Improvement Bonds, for the improvement of North Main and State Sts. in the sum of \$23,000. C. D. Atkinson is Village Clerk.

Bartlesville, Okla.—Two ordinances were passed by the City Comrs. this morning for the levying of paving assessments on certain streets. One was for the paving of Osage between Fourth and Thirtieth Sts. The other between Osage and Cherokee on Seventh St.

Nashville, Tenn.—Shelby Co. will expend \$1,000,000 improving county roads. Address Chairman McKay.

Austin, Tex.—City Engr. Iredell has prepared specifications for the paving of Lavaca and 19th Sts. and University Ave. Address City Engr.

Brownsville, Tex.—A paving extension of 17,500 yds. or the equivalent of twelve city blocks has been ordered by the City Council.

Taylor, Tex.—Sealed bids will be received Sept. 12, for the paving of nine blocks, comprising about 18,000 sq. ft. of the business streets of Taylor. Bids will be received on vitrified brick, Bitulithic and creosoted pine block. About \$75,000 will be expended on the work.

Salt Lake City, Utah.—Paving extension 75, embracing work on Second South St. between Tenth and Twelfth East Sts., will be paved with Utah rock asphalt.

Norfolk, Va.—Mayor Kiddick has signed and returned to the city clerk ordinances appropriating \$23,000 for the paving of Church St. Extended.

Roanoke, Va.—Sealed proposals addressed to W. L. Craft, City Clerk, will be received until Sept. 17 for the construction of a full width Granolithic sidewalk on the south side of Franklin Rd. between Second St. and west line of Grammar School property, and five ft. Granolithic sidewalk on west side of Commerce St. F. L. Gibbons is City Engr.

Wheeling, W. Va.—It is claimed that the Bethany Pike will be paved to the north end of Greggsville before the bad weather sets in.

Appleton, Wis.—The Grand Chute Road to the asylum is to be improved this year by paving with macadam, 14 ft. wide.

Superior, Wis.—At a special meeting of the Douglas Co. Bd. it was decided that the Barton Ave. road should be paved by the county.

The city commissioners will let contracts for paving main streets early in the year 1913. Address J. S. Konkel, Mayor.

St. Catharines, Ont.—The City Council has decided to have the roadway on St. Paul St. West paved with permanent Bitulithic pavement from Lissgar St., along the Western Hill. Cost, \$15,000.

Bids Received and Contracts Awarded.

Colton, Cal.—The following bids were received for improving Eighth St. from J to H Sts., I St. from Tenth to the Santa Fe tracks, and J St. from Eighth to Ninth St.: P. C. Nichols, Los Angeles, 14c. per sq. ft., paving; 15c. per lin. ft. gutter; 13½c. per lin. ft. iron culverts; \$1.94 per lin. ft. concrete culvert; \$1.65 per lin. ft. for 14-inch pipe, total, \$30,194.72. The Fairchild-Gilmore-Wilton Co., bid 16.4c., 14.9c., 15c., \$1.55, \$1.65, \$1.75; total, \$31,422.67. The Barber Asphalt Paving Co. bid 16.9c., 14.9c., 14.9c., \$2.65, \$2.50, \$1.75; total, \$32,761.63.

Los Angeles, Cal.—George E. Spain has been awarded a contract for improving De Longpre Ave. from Western Ave. to Wilton Pl. at \$1.45 per lin. ft. for grading and graveling complete; 55c. per sq. ft. for granite block gutter; 16c. per sq. ft. for cement gutter; 33c. per sq. ft. for vitrified block gutter; 11½c. per sq. ft. for sidewalk; total, \$3,932.93.

The Fairchild-Gilmore-Wilton Co. has been awarded the contract for improving Shatto Pl. between Fifth street and Wilshire Blvd., at 16.7 cts. per sq. ft. for asphalt paving; 30c. per lin. ft. for cement curb; 15c. per sq. ft. for cement gutter; total, \$7,756.65.

The Bd. of Pub. Works received the following bids for improving Boyle Ave. from Stephenson Ave. to Seventh St.: Fairchild-Gilmore-Wilton Co., 16.7c. for paving; 35c. for cement gutter; 30c. for vitrified block gutter; 40c. for granite block gutter; 12c. for sidewalk; \$1,062 for storm drains. Barber Asphalt Co., 18.3c. for paving; 40c. for cement curb; 33c. for vitrified block gutter; 46c. for granite block gutter; 12c. for sidewalk; \$1,160 for storm drains.

B. C. Nichols was awarded a contract for improving Canal St., Wilmington, at 18 7-10c. per sq. ft. for asphalt paving, 38c. per lin. ft. for cement curb, 60c. per sq. ft. for granite block gutter, 13c. per sq. ft. for sidewalk, \$8,500 for storm drains and appurtenances completed; total, \$29,120.86.

Orange, Cal.—The Los Angeles Paving Co., of Los Angeles, was awarded the contract for improving W. Chapman Ave. at 16c. per sq. ft. for paving and 14c. per sq. ft. for gutters. Other bidders were Fairchild-Gilmore-Wilton Co., 16½c. per sq. ft. for paving and 12c. for gutters; Barber Asphalt Paving Co., 18½c. per sq. ft. for paving and 16c. per sq. ft. for gutters.

Upland, Cal.—The Fairchild-Gilmore-Wilton Co. was awarded the contract for the paving of Second St. from A to H Sts. on its bid of 16.7c. per sq. ft. for asphalt paving, 11c. per sq. ft. for cement gutter, 25c. per lin. ft. for cement curb.

Hartford, Conn.—Contracts have been awarded by the State Highway Comr. for the following street work: Middlebury, Sections 3 and 4, E. G. Pardee, \$1,900 ft. of grading, \$2,187; 1,188 ft. of gravel road, \$1,000. New Milford, Sections 1 and 3, B. D. Pierce, Jr., Co., 6,300 lin. ft. of macadam and gravel at \$2.08 per lin. ft.; 5,124 lin. ft. of macadam and gravel at \$1.97 per lin. ft. Sections 2 and 4, Torrington Const. Co., 3,355 ft. of macadam and gravel, \$2.61

per lin. ft., 6,750 ft. of macadam and gravel, \$1.54 per lin. ft.

The following bids were received Aug. 22, by the State Highway Comr. for road work: Construction of special macadam road in Waterford, 9,669 ft., Amos Bridge's Sons, Inc., Hazardville, \$4.97 per ft.; Arrigoni Bros., Middletown, \$3.90 per ft. Construction of special macadam road in East Lyme, 5,518 ft., Amos Bridge's Sons, Inc., \$4.29 per ft.; Arrigoni Bros., \$3.90 per ft.; Bryan F. Mahan, New London, \$3.87 per ft.

Lowest bidders on other jobs were as follows: Town of Plainfield, 6,535 ft. of gravel macadam, A. Vido Constr. Co., Thompson, \$1.25; Town of Somers, 12,750 ft. of macadam gravel, A. Vido Constr. Co., \$1.76; Town of Farmington, 13,195 ft. special macadam, Pierson Engr. & Constr. Co., \$3.25; Town of Essex, 11,895 ft. of grading, A. Brazos & Son, Middle-town, \$10.974; Town of Hampden, 1,385 ft. of special macadam, Robert B. Bailey, New Haven, \$3.25 per ft.; Town of Guilford, 9,330 ft. of special macadam, Arrigoni Bros., \$3.85; Town of Wethersfield, 10,750 ft. of seven-in. macadam, A. Brazos & Son, \$1.50 per ft.; Town of Ellington, 19,860 ft. of gravel macadam, A. Vido Constr. Co., \$1.76 per ft.; Town of South Windsor, 6,100 ft. of seven-in. macadam, A. Brazos & Son, \$1.70 per ft.

Morristown, N. J.—The contract for constructing the Landing and Mt. Arlington Rd., 13,377 ft. long, has been awarded to Salmon Bros. at \$52,880.55. The contract for paving Boonton Ave., Butler, has been awarded to Cotter & Bergen at \$8,488.50. The road is about a mile long.

The Road Com. of the Bd. of Freeholders has recommended that the contract for building the boulevard through Mountain Lakes, a distance of two and one-half miles, be awarded to the Oak Ridge Co. at \$44,234.76.

Columbus, O.—The following contracts have been awarded for highway work by the State Highway Comr.: The Allensville Extension in Richland Twp., Vinton Co., E. C. Wortman, Hamden, \$12,299; Circleville-Washington Rd., Pickaway Co., Jas. L. Garver, Hamilton, \$11,961; Rimer Rd., Putnam Co., John Acton, Vaughnsville, \$5,063; Monroeville and Bloomington Rd., Erie Co., Ed. T. Hoffman, Castalia, \$4,195; Port Clinton Rd. in Rice Twp., Sandusky Co., 11,500 ft. to Croghan Constr. Co., contract price, \$22,900; grading and paving with waterbound macadam Sec. No. 1 of the Urbana and Mechanicsburg Rd. in Goshen Twp., Champaign Co., 3,248 ft. 12 ft. wide, to Samuel W. Wrightsels, Logan, contract price, \$5,139.54; for labor, grading and paving with concrete the Ghent Rd. in Copley and Bath Twp., Summit Co., length, 12,546.2 ft., 14 ft. wide, O'Brien & Stringer, Akron, O., at \$8,350.

Oak Harbor, O.—Bids were opened here for the paving of East Main St. The Modern Constr. Co. of Fremont, with a bid of \$9,029.40, was low.

Toppenish, Wash.—The contract for the paving of Toppenish Ave. for about ten blocks, two blocks on West First St. and other streets in the business districts has been awarded to the Barber Asphalt Co. of Spokane, on Bitulithic, for about \$70,000.

Walla Walla, Wash.—Bids will be received until 9 a. m., Sept. 10, for 3,500 sq. yds. concrete pavement, plain, two course top, Dolarway with curbing, grading, draining, etc., in Local Improvement Dist. No. 105.

BRIDGES

Bids Asked and Prospective Work

Santa Barbara, Cal.—Bids will be received up to 8 p. m., Sept. 19, by the City Council for the construction of a reinforced concrete bridge across Mission Creek at State St., in accordance with plans and specifications prepared by City Engr. Garland. Alfred Davis is City Clerk.

Sonoma, Cal.—County Surv. E. E. Newell of Tuolumne Co., as instructed by the Bd. of Spvs., has prepared plans for two reinforced concrete bridges, one at a cost of \$1,650 to span Wood's Creek on Brown's Flat Rd., in front of the old Sell place, and the other, to cost \$3,500, over Curtis Creek, near the McArlay ranch.

Challis, Ida.—Bids will be received Sept. 9 for the construction of a wooden bridge of 40 ft. span across the Yankee Fork River at a point about 300 ft. north of the mouth of the Yankee River, and for the construction of a steel bridge of one 40-ft. span across the Yankee River. Address E. J. Michael, Custer Co. Clerk.

Chicago, Ill.—Bids will be received Sept. 24 for furnishing all materials, tools, la-

bor and appliances for the construction of the substructure for a bascule bridge over the Calumet River at 92d St., including the approaches thereto, as well as the removal of all obstructions. Address L. E. McGinn, Cmr. of Pub. Works.

Goshen, Ind.—The Elkhart Co. Cmrs. will rebuild county bridges destroyed by flood. Address Co. Aud.

Eldorado, Kan.—Bids will be received at the office of the County Clk. of Butler Co. in the Court House, until noon, Sept. 12, for the construction of a concrete bridge in Augusta Twp. Specifications as follows: Reinforced, concrete superstructure, consisting of 2 50-ft. spans, 16-ft. roadway. Substructure consists of two concrete abutments and one middle pier, 33 ft. 6 in. high. Plans and specifications on file with the Co. Clerk at Butler and at the office of the State Engr. at Manhattan. Address Hon. Ed. Weidlein, Mayor of Augusta.

The Butler Co. Cmrs. will build a two-span concrete bridge east of Augusta. C. W. Buskirk, Co. Engr.

Girard, Kans.—Sealed bids will be received at Girard until Sept. 11 for the erection of six steel bridges with concrete floors on concrete arches in Crawford. D. C. Noel is Co. Clerk.

Marion, Kans.—Sealed bids will be received at the office of the Co. Clerk of Marion Co. until Sept. 14 for the building of the following bridges: 40-ft. reinforced concrete bridge, 16 ft. roadway, located between Sec. 5 and Sec. 8, Twp. 17, over Turkey Creek in Colfax Twp. One 60-ft. riveted steel truss, 16-ft. roadway with concrete floor, located between Sec. 35 and Sec. 36, township 18, range 2E, over Cottonwood River in Durham Park Twp. B. B. Reimer is Co. Clerk.

Springwells, Mich.—The Bd. of Spvs. recommends an appropriation to build a bridge over the Rouge River.

St. Paul, Minn.—Work on the proposed steel and reinforced concrete bridge over the Northern Pacific and Chicago, St. Paul, Minneapolis and Omaha tracks at Earl St., to eliminate the dangerous grade crossing, will be commenced soon. The aldermen passed a resolution accepting the plans for the structure as approved by Oscar Claussen, City Engr.

Grenada, Miss.—The Grenada Bd. will soon advertise for bids for two slough bridges in Dist. No. 3 north of river at Graysport, and an iron bridge across Schoona River, Dist. No. 3. Address John S. King, Clerk of Bd.

Cincinnati, O.—Sealed proposals will be received until Sept. 13, for the concrete bridge on Cincinnati and Dayton pike in Sharonville, Sycamore Twp. Albert Reinhardt is Clerk.

Wagoner, Okla.—Bids will be received Oct. 5 for the furnishing of all material and labor necessary for the erection of four bridges in Wagoner Co. One on the Arkansas River, one on Verdigris River and one on the Grand River. Address J. E. McElroy, Co. Clerk.

Lawrenceville, Va.—Sealed bids will be received by the Bd. of Spvs. of Brunswick Co. at Lawrenceville, until 10 a. m., Sept. 23, for the construction of a bridge over the Waqua Creek, near Rawlings. Approximate length, 80 ft. with a 12-ft. roadway. Character of superstructure, one standard 80-ft. span; character of substructure, old masonry encased in concrete. Substructure also includes tearing down present bridge. Plans and specifications can be seen at the Circuit Court of Brunswick Co., or at the office of the State Highway Engr. at Richmond.

Bids Received and Contracts Awarded.

Marked Tree, Ark.—J. E. Clanton of Tyrone has been awarded the contract for building the wooden drawbridge at Potter's Ferry to connect Marked Tree with Lepanto. The bridge will have a 28-ft. draw in the center, and will cost \$1,475.

Fullerton, Cal.—The contract for the construction of two reinforced concrete bridges, one on Whittier Rd. and the other on Chapman Ave. has been awarded to Chas. Stansberry, Los Angeles, at \$6,231.

Los Angeles, Cal.—The Russell-Greene-Foell Co., Higgins building, Los Angeles, was the lowest bidder, at \$9,883, for constructing a bridge over the Old San Gabriel River on the Downey and Florence Rd. The other bids received were: Security Const. Co., \$10,116; Edgar T. Wheeler, \$10,200; Mercereau Bridge & Const. Co., \$10,300; L. Linderman, \$10,673; G. C. Munoz, \$11,988.90.

Marysville, Cal.—The Bd. of Spvs. opened bids Aug. 17 for the construction

of the proposed new bridge at Parks Bar, on the Yuba River. The bids received were taken under advisement and were as follows: F. A. Hawthorne, San Francisco, concrete, \$34,500; Mervy-Elwell Co., Oakland, steel, \$28,045; Dundon's Iron Works, San Francisco, steel, \$28,000; Clark & Henery, Sacramento, steel, \$28,200; concrete, \$38,000; Ross Const. Co., Sacramento, steel, \$25,940; concrete, \$39,947; Chico Const. Co., Chico, steel, \$29,000; Portland Concrete Pile Co., Portland, Ore., concrete, \$31,600; Burrell Bridge & Const. Co., Oakland, steel, \$28,770.

Morgan Hill, Cal.—The Bd. of Spvrs. has awarded the contract for the building of the concrete bridge over the Llagas on Sycamore Ave. to John Doyle for \$1,627 and for another bridge of the same character on Llagas Ave. to Wm. Radtka for \$1,590.

Riverside, Cal.—Robert H. Swinney of San Bernardino, was awarded the contract for the construction of the four-span highway bridge across the Riverside-Rialto Rd. on his bid of \$4,203.85. Other bidders were Chas. M. Lefler, \$4,300; Mercereau Bridge & Const. Co., \$5,130.

Santa Ana, Cal.—The following bids were received for the construction of a highway bridge across Soquel Wash in the northern portion of the county: Mercereau Bridge & Const. Co., \$5,870; Chas. Stansbury, \$6,498.50.

Oscar Ford was awarded the contract at \$9,400 for the construction of the Sevierville Canyon Rd. and the construction of a bridge. Frank O'Hara bid \$11,294.

Santa Barbara, Cal.—Charles W. Deacon was the only bidder for the construction of the highway bridge across the Alamo Ocatto River at Los Olivas, and was awarded the contract at \$7,900.

Victor, Cal.—The contract for building a bridge across the Mokelumne River, at this point on the new Sacramento-Stockton Rd., has been let to Jenkins & Wells at \$23,422.

Naugatuck, Conn.—A contract has been awarded to Gardner C. Riggs, Waterbury, for the construction of a concrete bridge at Cotton Hollow, between Beacon Falls and Naugatuck. The bid was \$4,448.

Deerfield, Fla.—The contract for the construction of a 124-ft. bridge has been awarded by the City Council to the Champion Bridge Co. of Wilmington, O., at \$7,700.

Des Moines, Ia.—The Bd. of Spvrs. of Polk Co. has awarded the contract for the erection of four bridges in Saylor, Douglas, Webster and Crocker Twps. to N. M. Stark of Des Moines.

Marshalltown, Ia.—The Co. Comrs. of Marshall Co. have awarded the contract for the construction of a reinforced concrete bridge over the Iowa River on the Main St. road to The Capital City Constr. Co. of Des Moines, at \$7,439.

Ellisville, Miss.—A contract has been awarded to Austin Bros., of Atlanta, Ga., at \$4,770 for the construction of a steel bridge, 176 ft. long, over the Leaf River.

Canastota, N. Y.—The contract for paving Chapel and New Boston Sts., from North Peterboro St. to Taylor Ave. with Bessemer paving blocks, has been awarded to R. W. Henson, Geneva, N. Y., at \$23,324.

Massena, N. Y.—The contract for the building of the Raquette River Bridge at the St. Regis Indian Reservation has been awarded to E. M. Foss and S. T. Bero of Hogsburg, N. Y., for \$20,154.52. Other bids were as follows: Oswego Bridge Co., Oswego, \$20,671.42; James McGrotty, Massena, \$21,875.

New York, N. Y.—The contract for the construction of one reinforced concrete, single arch highway bridge, one 175-ft. span, 25 ft. rise, and one plain concrete, single arch, 50-ft. span, 12 ft. rise, near Brown's Station in the towns of Olive and Marletown, respectively, has been awarded to Ward & Tully, Inc., West Shokan, N. Y., at \$160,276.

Columbus, O.—The contract for the construction of a concrete arch bridge over Black Sink Creek has been awarded to the Climax Const. Co. of Columbus at \$10,957.

Findlay, O.—A contract has been awarded by the Hancock Co. Comrs. for the construction of a bridge with two 90-ft. spans over the Blanchard River in Liberty Twp. to Sylvester Jacobs of Findlay, at \$13,300.

Mineral City, O.—The Co. Comrs. of Tuscarawas Co. have awarded the contract for the construction of a superstruc-

ture of a bridge over the Tuscarawas River to the Home Engrg. & Contr. Co., at \$14,280.

Lewisburg, Pa.—The contract for the construction of a bridge over the Susquehanna River between Milton and West Milton has been awarded to the Owego Bridge Co. of Owego, N. Y., at \$10,600.

Pittsburgh, Pa.—Contracts have been awarded by the City Compt. to the Pittsburgh Const. Co., Pittsburgh, for repairing the Seventh St. and 30th St. bridges at \$44,000 and \$27,000, respectively.

BONDS.

Selma, Ala.—The Court of Co. Comrs. of Dallas Co. has sold the issue of \$100,000 in bonds recently authorized by the voters of Selma to the National Bank at a premium of \$4,255.

Alhambra, Cal.—Bonds in the sum of \$15,000 were voted by the city of Alhambra for new bridges at the special election held Aug. 6. Bonds in the sum of \$17,000 were voted at the same election for the construction of storm drains.

Larkspur, Cal.—\$35,000 in bonds has been voted for street improvements. Address City Clerk.

Madera, Cal.—The Bd. of Spvs. of Madera Co. will call a bond election for the purpose of voting bonds in the sum of \$600,000 for county road improvements. Preliminary plans have been drawn by the Co. Engr.

St. Augustine, Fla.—A bond issue for the purpose of constructing a system of good roads in St. Johns Co., will probably be decided upon by the voters at the election, Nov. 5.

West Palm Beach, Fla.—Bids will be received Sept. 10 for the sale of \$60,000, 30-year 5 per cent. special road and bridge Dist. No. 2 bonds. Address H. B. Saunders, Jr., City Clerk.

Bids will be received Sept. 10 for the sale of \$85,000 40-year 5 per cent. special road and bridge Dist. No. 1 bonds. Address H. B. Saunders, City Clerk.

Calhoun, Ga.—A special election has been set for Sept. 13, when the voters of Gordon Co. will decide whether or not the county shall issue \$150,000 in bonds for the purpose of improving the public roads.

Lexington, Ga.—An election will soon be held to decide the question of issuing \$40,000 in bonds for road purposes. Address Oglethorpe Co. Clerk.

Kankakee, Ill.—The \$30,000 bond issue for hard roads in Momence Twp. was favorably voted recently by the people at a special election.

Milford, Ill.—Three thousands dollars in bonds has been voted for paving purposes. Address City Clerk.

Momence, Ill.—Thirty thousand dollars in bonds has been voted for good roads. Address City Clerk.

Rock Falls, Ill.—A bond issue of \$6,000 was authorized at a recent election, the proceeds to be used to pay the city's share of the cost of paving First St.

Topeka, Kans.—The special election to vote bonds for the rebuilding of fifteen bridges will be called for Sept. 24. The amount of the proposed issue will be placed at \$145,340. The date for the election and extent of the expenditure were announced by W. G. Tandy, Comr. of Streets.

South Haven, Mich.—An election will be held to decide the question of issuing \$5,000 stone road bonds. Address G. W. Matthews, Twp. Clerk.

Bemidji, Minn.—At a special election here, bonds were voted to defray the cost of paving the road between Bemidji and Nymore.

Gulport, Miss.—The Harrison Co. Bd. of Spvrs. will issue road improvement bonds to the amount of \$15,000 in Beat 3.

Hattiesburg, Miss.—The Bd. of Spvrs. has ordered the clerk to give notice of intention to issue \$50,000 5 per cent. bonds for the building of good roads. The bonds will be issued in September unless a petition against such an issue is signed by 20 per cent. of the taxpayers of Forrest Co.

Raleigh, Miss.—Bonds to the extent of \$40,000, the proceeds of which will be used for the construction of good roads, have been voted in Dist. No. 1 of Smith Co., and \$12,000 have been voted for the same purpose in Dist. No. 3.

Springfield, Mo.—Seventy-five thousand dollars in bonds has been voted for paving purposes.

St. Louis, Mo.—At the November election the proposition to issue bridge bonds will be submitted to the voters for the third time. Address Frederick H. Kreiselman, Mayor.

Beatrice, Neb.—Eleven thousand dollars in bonds has been voted for paving purposes. Address City Clerk.

Holdrege, Neb.—An election will be held Sept. 17 to vote on the proposition of issuing \$5,000 in bonds for public parks. Address City Clerk.

Elizabeth, N. J.—The Bd. of Freeholders of Union Co. has sold \$45,000 of county road bonds to J. D. Everitt Co., 9 Wall St., New York City.

Kenmare, N. D.—Four thousand dollars in bonds has been voted for laying walks and water mains. Address City Clerk.

Amsterdam, O.—Bids will be received Sept. 23 for the purchase of \$943 5 per cent. paving bonds, payable in the years 1914 to 1919. Address Richard Jones, VII. Clerk.

Cleveland, O.—Sealed bids will be received by the Bd. of Co. Comrs. of Cuyahoga Co., until Sept. 18, for the purchase of bonds in the sum of \$10,300 for the improvement of Fischer Road No. 2. John F. Goldenbogen is Co. Clerk.

Cleveland, O.—The Co. Comrs. of Cuyahoga Co. have sold the \$63,000 state road bond issue to the First National Bank of Cleveland at a premium of \$1,065.90.

Columbus, O.—The First National Bank has purchased the \$32,000 road bond issue recently authorized by Franklin Co. at a premium of \$510.

Lisbon, O.—Bids will be received Sept. 9 for the purchase of \$18,637.60 4½ per cent. road bonds. Address P. R. Walker, Clerk.

Ottawa, O.—Bids will be received Sept. 12 for the sale of \$14,000 5 per cent., five to nine-year road bonds. Address John E. Roose, Putnam Co. Aud.

Port Clinton, O.—The residents of Erie Twp. have voted to issue \$10,000 bonds for the improvements of roads from Lacarne to Camp Perry.

Sunbury, O.—Sealed proposals will be received until Sept. 9, for the purchase of special assessment bonds in the sum of \$1,880, for the improvement of Cherry St. Milton Utley, VII. Clerk.

Toledo, O.—An ordinance was passed to issue bonds in the sum of \$24,000 for the purpose of paying for the improvement of Broadway by repaving between the outer rails of the tracks of the Toledo Railways & Light Co., from Knapp St. to Colburn St.

Waterville, O.—Bids will be received Sept. 16 at the office of the Clerk of the village of Waterville for the purchase of \$9,327 5 per cent. street improvement bonds. Address C. J. Fisher, Clerk.

Connellsville, Pa.—At the November election the question of issuing \$50,000 paving bonds will again be submitted to a vote of the people.

Farrell, Pa.—Bids will be received within a few weeks for the purchase of \$50,000 30-year 4½ per cent. street and re-funding bonds. Present indebtedness, \$205,000. Address Jno. J. Nolan, Secy.

Greenville, Pa.—Sixty-eight thousand dollars in bonds will be issued by the borough at once for the paving of a number of streets. Address Bor. Clerk.

Chattanooga, Tenn.—A resolution has been passed by the City Council providing for the issue of \$45,000 in bonds, the proceeds of which will be spent in the improvements of streets in certain paving districts recently outlined.

Lawrenceburg, Tenn.—An election will be held in Lawrence Co. on Oct. 5, to vote upon a \$200,000 bond issue for the purpose of building macadamized roads.

Bay City, Tex.—Eleven thousand dollars in bonds has been voted for street improvements. Address City Clerk.

Brownsville, Tex.—An election will be held in October, to decide the question of issuing \$250,000 for the construction of macadamized Cameron Co. roads. Address Co. Clerk.

Cameron, Tex.—An election for the purpose of voting on a proposed bond issue of \$200,000 for road improvements has been ordered at Cameron, Sept. 17.

Ferris, Tex.—The people of District No. 9, Ellis Co., by a vote of 2 to 1, authorized the issuance of 40-year five per cent. bonds to the amount of \$100,000, with which to improve the roads in the district.

NOTICE TO CONTRACTORS

STATE OF NEW YORK

Office of the State Commission of Highways, Albany, N. Y.

Pursuant to the provisions of Chapter 30, Laws of 1909, and Chapter 646, Laws of 1911, sealed proposals will be received by the undersigned at their office, No. 55 Lancaster St., Albany, N. Y., at one o'clock P. M. on Monday the 9th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County.	Road No.	Name.	Approx. Length.
Allegany	5312	Cuba-Friendship, Pt. 2	6.10	Onondaga	5365	Syracuse-Lafayette	7.00
Broome	5339	Binghamton City; Court St.	1.05	Orange	5323	West Point-Central Valley	11.20
Broome	1106	Harpersville-Onaquaga	5.10	Oswego	5250	Central Sq.-Union Sq., Pt. 1	7.00
Chautauqua	5217	Jamestown-Bemus Point	7.96	Rensselaer	5354	Raymertown-Hoosick, Pt. 2	5.11
Chautauqua	5263	Dewittville-Mayville	5.51	Steuben	5342	Cemetery Hill; Hornell	0.61
Clinton	5197	Plattsburg City	1.79	Steuben	5349	Painted Post-Addison, Pt. 3	4.98
Clinton	5228	Rouses Point Village	2.24	Steuben	5351	Avoca Village	1.50
Columbia	5317	Hillsdale-Copake Iron Works	4.85	Steuben	5353	Hornell City; Canisteo St.	0.24
Delaware	5343	Grand Gorge-Stamford	12.14	Schuyler & Yates	5334	Watkins-Yates County Line	7.57
Delaware	5383	East Branch-Trout Brook	2.27	Suffolk	5301	Bayshore-Brookhaven	12.92
Delaware	5384	Margaretville-Halcottsville	6.23	Tompkins	5379	Ithaca-West Danby, Pt. 1	3.22
Dutchess	5326	Dover Plains-Pawling Town Line, Pt. 2	3.93	Washington	5316	Cambridge-Salem, Pt. 3	3.09
Greene	5367	Catskill-Athens	5.97	Westchester	5321	White Plains-Rye	1.64
Greene	5369	Coxsackie Village	2.31	Westchester	5357	Bronxville Village	0.95
Jefferson-Lewis	5332	Lowville-Carthage	14.33	Westchester	5358	Mt. Vernon City; Columbus Av.	0.28
Lewis	5327	Oneida County Line-Turin	14.77	Westchester	5359	Yonkers City; Central Park Av.	6.48
Madison	5329	Cazanovia-Morrisville	10.11	Westchester	5360	East View-Briarcliff Manor	5.04
Niagara	5319	Wrights Corners-Hartland	6.64	Westchester	5361	Briarcliff Manor Village	0.83
Niagara	5381	La Salle Bridge	0.09	Westchester	5362	Tuckahoe Village	0.25
Oneida	5346	Remsen-Boonville Town Line	6.12	Westchester	5363	Peekskill Village	2.27
Oneida	5325	Whitesboro-Trenton	12.37	Westchester	5364	Ossining-Croton River	1.66
				Yates	5324	Dundee-Penn Yan	10.89

Sealed proposals will also be received by the undersigned at their office, No. 55 Lancaster Street, Albany, N. Y., at one o'clock P. M. on Tuesday the 10th day of September, 1912, for the improvement of the following highways:

County.	Road No.	Name.	Approx. Length.	County.	Road No.	Name.	Approx. Length.
Albany	1105	Albany City; Central Ave.	0.75	Oswego	5382	Fulton-Oswego	12.00
Allegany	5341	Friendship-Belmont	6.80	Saratoga	5313	Stillwater Village	1.30
Broome	5377	Riverside Drive-Binghamton	1.91	Schoharie	5286	Howes Cave-Cobleskill	4.76
Broome	5338	Windsor-Deposit	13.84	Schuyler	5335	Watkins Village; Franklin St.	1.75
Chemung	1095	Elmira City; So. Broadway	1.12	St. Lawrence	5331	Gouverneur Village	1.73
Cattaraugus	5259	Salamanca-Little Valley, Pt. 3	6.86	Steuben	5348	Canisteo-Jasper	12.82
Chautauqua	5245	Bemus Point-Dewittville	5.97	Steuben	5352	Arkport-Danville	10.38
Chautauqua	5240	Westfield Village	1.07	Suffolk	5232	Smithtown-Port Jefferson	11.25
Clinton	5199	Chazy-Rouses Point	8.25	Sullivan	5322	Monticello-Liberty, Pt. 2	8.45
Clinton	5337	Rouses Point-Canadian Line	2.36	Tioga	5333	Waverly Village	1.28
Delaware	5340	Colchester-Sullivan County Line	8.00	Washington	5336	Salem-Granville, Pt. 2	9.48
Greene	5366	Catskill Village	1.97	Washington	1082	Cambridge Village	1.71
Greene	5368	Athens-Coxsackie	4.06	Westchester	5371	Larchmont Village	0.95
Greene	5370	Coxsackie-Ravenna, Pt. 2	2.70	Westchester	5372	New Rochelle-Mamaroneck	0.73
Jefferson	5344	Carthage Village	2.12	Westchester	5373	Rye Village	2.85
Madison	5380	Morrisville-Bouckville	5.63	Westchester	5374	Pelham-New Rochelle	0.20
Madison	5380	Bouckville-Madison	2.45	Westchester	5375	Pelham Manor Village	1.34
Onondaga	5318	Camillus-Fairmount, Pt. 2	1.20	Westchester	5376	Mamaroneck Village	1.29
Oneida	5345	Trenton-Remsen	5.49	Westchester	(3)5365	Tuckahoe-White Plains, Pt. 1	2.43
Ontario-Yates	5323	Penn Yan-Halls Corners	8.15	Westchester	5366	White Plains Village	2.02
Orleans	5315	Medina Village	2.45	Wayne	5378	Ontario-Center-Williamson	4.50

After August 26, 1912, maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y., and also at the office of Division Engineer Spencer J. Stewart, Realty Building, White Plains, N. Y., for highways in the counties of Dutchess, Orange, Suffolk, Sullivan and Westchester; at the home of Division Engineer Paul McCloud, Humane Building, Albany, N. Y., for highways in the counties of Albany, Clinton, Columbia, Greene, Rensselaer, Saratoga, Schoharie and Washington; also at the office of Division Engineer James H. Sturtevant, Cleveland Building, Watertown, N. Y., for highways in the counties of Jefferson, Lewis, Oneida and St. Lawrence; also at the office of Division Engineer Frederick Steel Strong, 433 South Salina Street, Syracuse, N. Y., for highways in the counties of Madison, Onondaga, Ontario, Oswego, Wayne and Yates; also at the office of Division Engineer James P. Morrissey, 423 Cutler Building, Rochester, N. Y., for highways in the counties of Allegany, Cattaraugus, Chautauqua, Niagara and Orleans; and also at the office of Division Engineer Perry Filkin, 901 Press Building, Binghamton, N. Y., for highways in the counties of Broome, Chemung, Delaware, Schuyler, Steuben, Tioga and Tompkins.

The special attention of bidders is called to "Information for Proposers" on pages 1 to 10 inclusive, of the specifications.

Proposals for each highway must be presented in a separate sealed envelope endorsed on the outside with the name and number of the highway for which the proposal is made.

Each proposal must be accompanied by a New York draft or certified check payable to the order of the State Commission of Highways for an amount equal to at least five per cent. of the amount of the proposal which such draft or check accompanies. This draft or check will be held by the Commission until the contract and bond are duly executed.

The successful bidder will be required to give a bond for fifty per cent. of the amount of the contract; such bond to be executed by a Surety Company to be approved by the Commission, or a bond secured by the deposit of collateral securities to be approved by the Commission.

The right is reserved to reject any or all bids.

C. GORDON REEL,
Superintendent of Highways.
JOHN A. BENDEL,
State Engineer.
DUNCAN W. PECK,
Superintendent of Public Works.

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Milwaukee, Wis.—The Common Council Finance Comm. has decided to submit a bond issue of \$150,000 to voters for a bascule bridge over the Milwaukee River on State St. P. F. Leach is City Clerk.

MISCELLANEOUS.

Chicago, Ill.—Bids will be received Sept. 11 for furnishing labor, tools, material and appliances for furnishing, fabricating and delivering structural steel and steel castings, bolts, rivets and accessories for a temporary bridge over the North branch of the Chicago River at Belmont Ave., according to plans and specifications on file in the office of the Dept. of Pub. Works. Address L. E. McGann, Cmr. of Pub. Works.

Boonville, Miss.—Sealed proposals will be received by the Highway Comrs. of Spva. Dist. No. 1, G. L. Holley, Secy., Prentiss Co., until 3 p. m., Sept. 14, for the improvement of approximately 25 miles of road. Novaculite, chert or gravel will be used in finishing surfaces. Alternate bids on sand clay surfacing will also be taken. Concrete will be used in the construction of small bridges and culverts. Vitrified pipe will be used where practicable. Bids will be received for doing the entire work or for any division thereof separately, consisting of grading, bridging, surfacing and furnishing all material necessary. Plans, profiles and specifications on file at the office of the Chancery Clk. of Prentiss Co. at the office of Xavier H. Kramer, Engr., Magnolia, Miss., and at the office of G. L. Holly, Secretary of the Highway Comm., at Boonville.

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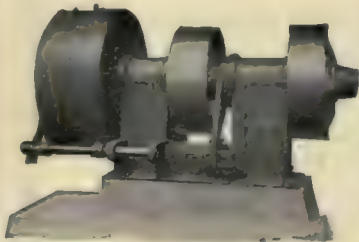
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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, SEPTEMBER 14, 1912

Number
11

Sixth International Congress for Testing Materials

About 400 members, representing 27 countries, were present at the opening of the sixth congress of the International Association for Testing Materials at the Engineering Societies Building, New York City, September 3.

Capt. Robert W. Hunt, President of the American Society for Testing Materials, called the meeting to order and welcomed the members of the International Association in behalf of the American organization. Capt. Hunt referred to the death of Pres. Chas. B. Dudley of the International association, calling attention to the fact that Dr. Henry M. Howe of the executive committee had been appointed Acting President of the Congress.

Director A. Martens of the Royal Testing Laboratory at Gross Lichterfelde was the first speaker after Capt. Hunt's opening address. Mr. Martens announced that Dr. Howe would take charge of the meeting. Brig. Gen. Wm. H. Bixby, Chief of the Corps of Engineers, U. S. A., representing President Taft, addressed the congress in French and English. Governor John A. Dix of New York welcomed the Congress on behalf of the state of New York, and Comptroller Prendergast of New York City performed a similar function in behalf of the city of New York.

The president's address by Dr. Howe followed. He welcomed the delegates in several different languages, in recognition of the international character of the organization. He referred to the general purpose of the association, stating that it was to serve humanity by enabling it to distinguish the fit from the unfit among the materials from which the great utilities of the world are made. He spoke of the importance of this function of the testing engineer, in that he stands between the public and manufacturer who supplies the public, to measure the degree of the fitness of those supplies, to reject the unfit and to act as a guardian of the lives of those who travel by land and sea, and who live or work in buildings of important sizes.

An important phase of the work of the association, Dr. Howe said, is the unification of the methods of testing throughout the world, so that the buyer is more able to weigh the relative merits of all competing materials of a given kind, from whatever country they may come. After having described the purposes of the society, he called attention to evidences of the progress made in accomplishing its purposes since the last Congress. He stated that four new countries have become identified with the council of the organization, Japan, China, Canada and Brazil, making the total number of countries now represented in the council, 25. The membership has increased from 2,160 to 2,630 or 24 per cent. up to the beginning of the present year, and now represents 30 countries and every continent in the world. Two new national societies have been organized in Russia which are closely affiliated with the organization.

He mentioned the fact that the volume of papers for the Sixth Congress was twice as large as that of any previous congress, and also that the council contemplated ways of lessening impediments to the efficiency of the in-

ternational committees, due both to the difficulties engendered by difference in languages and to the usual need of carrying on their deliberations by correspondence instead of face to face.

In closing, he asked the members of the committees who have carried out the work of organizing the congress to rise and receive his thanks on behalf of the association, and he asked the chairmen of the various committees and the officers of the sub-committees to express the gratitude of the association to absent members of the committees. He also expressed thanks to General Secretary Reitler and Secretary Porter.

The professional work of the Congress was divided into three sections. Section A was devoted to metals, section B to cement, stone and concrete, and section C to wood, oil, bitumen, rubber and other materials. The sessions of each section were conducted independently of the other two. Eighteen sessions were held altogether by the three sections, three being held at a time. The related subjects were grouped together in such a way as to enable the members to utilize their time to the best advantage. Proceedings were conducted in English, German and French, all important transactions in one language being translated immediately into the others by officials of the several sections. All papers were printed in advance, and abstracts of them were also published.

Capt. Robert W. Hunt was chairman of section A; Henry Souther of section A2, which was a branch of section A, organized to hold a single session; R. W. Lesley of section B, and Prof. Mansfield Merriman of section C.

Among the proceedings of interest to street and highway builders and engineers was a paper on the topic, "Progressive Increase in the Strength of Cement Mortars," by E. Candlot, Paris, and a discussion on the value of the Le Chatelier test for the constancy of volume of cements. Four papers on this subject were presented by Messrs. Bertram Blount, M. Gary, F. Schule and J. Bied.

Considerable interest was evidenced in a proposal to endeavor to bring about uniform divisions of bituminous materials, which was referred to the committee on resolutions.

Prevost Hubbard, Consulting Chemist, Institute of Industrial Research, Washington, D. C., read a paper on the "Bitumen Content of Coarse Bituminous Aggregates," calling attention to the fact that where mixtures of materials of different specific gravities are prepared a statement of the proportions and percentages of the total weight may be very misleading. He stated that two aggregates, each having 6 per cent. by weight of bituminous material, may show a variation of 9.3 to 29.3 gallons of pure bitumen per cubic yard of crushed rock owing to the difference in composition and specific gravity of the constituents.

A number of resolutions were adopted during the sessions covering specifications for the manufacture of Portland cement, reinforced concrete and for testing road materials. The last named resolution provided that the Congress be asked to create a commission for the unification of the method of testing materials for roads and of the

nomenclature of such materials, such commission to work in collaboration with the Executive Bureau of the International Roads Congress.

A formal reception to members of the Congress and their guests was held on the evening preceding the regular sessions of the Congress. The reception was conducted by The American Society for Testing Materials, The American Institute of Electrical Engineers, The American Society of Mechanical Engineers and The American Institute of Mining Engineers jointly.

The members visited the New York Public Library on the evening of September 3, and on the afternoon of September 4 visited the United States Military Academy at West Point.

On Thursday evening, September 5, the foreign delegates to the Congress were received by the American Society of Civil Engineers in its house at 220 W. 57th St. An illustrated address on "Engineering Activities in New York City," was delivered by Alfred D. Flinn.

The closing general session of the Congress was held Saturday morning, September 7. Following the work of the Congress a railway excursion was made Sunday, September 8, and continued through the week. On this tour the delegates made trips to Washington, Pittsburgh, Buffalo and Niagara Falls. At Washington, September 10, a reception was given the delegates at the White House by the Secretary of Commerce and Labor, acting for President Taft. A visit was also made to the laboratory of the Bureau of Standards at Washington. At Pittsburgh an inspection was made of the laboratories of the Bureau of Mines and the Bureau of Standards.

South Dakota Good Roads Association

At a good roads meeting recently held at Pierre, S. D., officers of a permanent organization, to be known as The South Dakota Good Roads Association, were elected.

J. W. Parmley of Ipswich was made President; E. C. Issenhuth of Redfield, First Vice President; J. L. White of Sioux Falls, Second Vice President; Ben M. Wood of Rapid City, Secretary, and J. W. Campbell of Huron, Treasurer. An executive committee consisting of the officers and a member from each of the three Congressional districts of the state was selected.

The association will be interested in the different good roads projects throughout the state, and will work for legislation along the lines of highway improvement. Special attention will be given to maintenance after highways have been built.

Second Clay Products Exposition

The Clay Products Exposition Co. is distributing a prospectus of the Second Clay Products Exposition, which will be held at the Coliseum, Chicago, Ill., February 26 to March 8, 1913.

The booklet is attractively compiled, and is printed in colors, with elaborate illustrations, showing various types of the exhibits of the first exposition held in March, 1912.

A tentative statement of what is to be expected at the second exposition is given, together with rules and regulations governing the exposition. Applications for space will be considered, as far as possible, in the order in which they are received. Regular application blanks will be furnished. The first allotment for space will take place on September 20, and all applications for allotment on that date must be filed at the office of the company, 815 Chamber of Commerce Building, not later than September 19.

The formal opening of the exposition will take place Wednesday evening, February 26, at eight o'clock, and the exposition will open each day thereafter at 10 a. m. and will close at 10:30 p. m.

Meeting of the Michigan Good Roads Association

A state meeting of the Michigan Good Roads Association will be held at Kalamazoo, September 18 and 19. County commissioners, mayors and presidents of villages and members of business men's associations from various parts of the state are expected to be present.

Philip T. Colgrove of Hastings, President of the Association, states that one of the principal projects which the association hopes to accomplish is the construction of a highway between Detroit and Toledo through Monroe County. Mr. Colgrove also says that the aim of the association is to connect the scattered miles of improved roads throughout the state and to establish a system of roads which will enable travelers to go from one point to another without encountering stretches of bad roads.

Plan to Mark Highway Routes

A plan for designating the various highway routes throughout the state of New York by distinctive colors for each route, for the convenience of motorists, is being formulated by Frank D. Lyon, Secretary of the New York State Automobile Association.

If this color plan is carried out the work will be undertaken by the States Highway Department and the various local automobile clubs.

Mr. Lyon, at a recent conference with Superintendent Reel of the State Department of Highways, suggested that the department paint the top rail of all the fences erected by the state along improved highways in the color assigned to that particular route. It is also proposed that the department paint an 18-inch strip of color on bridges.

The telephone and telegraph companies have been asked to permit their poles along the various routes to be marked with a band of paint and colored discs will be used along streets in cities.

Mr. Lyon states that if this plan is carried out maps will be issued showing these routes in their proper colors which it is thought will be much less confusing to motorists than those in use at present.

Proposed New Highway in Colorado

A conference was recently held by members of the State Highway Commission of Colorado and the County Commissioners of Gunnison and Delta Counties on the matter of designating the proposed new highway over Black Mesa as a state road. Black Mesa is a stretch of country extending from Sapinero in Gunnison County to a point in southeastern Delta County and crossing a corner of Montrose County.

The lower portion of the proposed road, after leaving Currecanti in Gunnison County and following along the ledge of the Black Canon, goes through one of the finest scenic sections of the state.

The Commissioners of Gunnison and Delta Counties decided several weeks ago to build a new highway over Black Mesa at the expense of their respective counties, and to ask future aid from the state in case the highway commission should conclude to accept the road as a state highway.

The surveyors sent out to view the proposed route have made a report recommending that the road be constructed by the two counties. The members of the State Highway Commission will submit their decision later.

C. Gordon Reel, State Superintendent of Highways of New York, has announced that state road contractors have been instructed not to leave tarred or bituminated stone roadbeds unprotected by a top dressing between the close of work on Saturday and the beginning of work on Monday, a period during which motor traffic is generally the heaviest.

GOOD ROADS

Founded January, 1892.

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New Series
Vol. IV. No. 11

SEPTEMBER 14, 1912

The Cement Shows

The Cement Products Exhibition Co., which will conduct cement shows in Chicago, Ill., and Pittsburgh, Pa., December 12-18, 1912, and January 16-23, 1913, respectively, is distributing copies of the rules and regulations, floor diagrams and application blanks for exhibition space.

The announcement is made that the drawing for space will be held in the office of the Cement Products Exposition Co. at 72 W. Adams St., Chicago, on September 26, and that applications to be considered in the first allotment must be filed on or before September 24.

According to the rules and regulations, exhibits may comprise cement, cement products, cement and concrete machinery, reinforcing materials, coloring mixtures, water-proofing compounds, aggregates, and publications pertaining to the use of Portland cement. Only such Portland cement manufacturers as are members of the Association of American Portland Cement Manufacturers will be permitted to exhibit. The prices of space and equipment are shown on the official diagram. The prices include dividing railings, floor coverings, signs, chairs and table for each space, the erection and installation of all necessary decorations, and police, watchman and janitor service, but does not include wiring for motors or any item except those stated.

The show in Pittsburgh will be the first cement show held in that city. It will be held in Exposition Hall, which is centrally located, and is built expressly for exposition purposes at a cost of over a million dollars. The building is especially well adapted for show purposes and free from columns, posts or other obstructions to the view. The Ninth Annual Convention of the National Association of Cement Users will be held in connection with the Pittsburgh show.

Traffic Regulations in Allegheny County, Pennsylvania

The Board of County Commissioners of Allegheny County, Pa., has issued a set of rules to govern teamsters and other road users in order to protect the improved highways. It is stated that violations will be followed by prosecutions and that the commissioners mean to keep strict supervision over the manner in which the county roads are used, by means of the 100 caretakers in charge of the 400 miles of improved roads in the county.

Considerable space is given in the rules to the matter of the weight which may be hauled over the roads, which is regulated according to the width of the tires. Wagons weighing, loaded, up to 3,500 lbs. must be equipped with tires at least 2½ ins. wide; between 3,500 and 6,000 lbs., 4 ins. wide, and between 6,000 and 15,000 lbs., at least 6 ins. wide. A loaded wagon weighing over 15,000 lbs. must not be hauled without a special permit.

The use of chain deadlocks and steel struts with forked ends is forbidden on grades, and when the use of a deadlock is necessary the lock must consist of a steel shoe of a pattern approved by the commissioners. Traction engines must have wheels with smooth surfaces. Special permits must be obtained before the drainage or passage of any road may be obstructed, for the transporting of any heavy load by dragging or sledding (sleighting excepted) and for cutting or digging the surface of the road.

Other rules adopted by the commissioners are as follows:

"Common Law Rules of the Road.—(a) Turn to the right of the center when meeting one coming in the opposite direction; (b) pass on the left when going in the same direction, the person overtaken must turn to the right to give the necessary room to pass; (c) at street and road crossings persons on foot have superior rights.

"Under Statutes.—Motor vehicles are not allowed to speed in excess of 24 miles an hour; motor vehicles when overtaking a person or vehicle going in the same direction must sound a horn or signal device as a warning; in case of frightened horses or other animals, when passing, motor vehicle must stop until danger is over; motor vehicles shall not pass a street car on the side where passengers are being discharged or taken on."

Rule of the Road in New Brunswick

A recent number of the "Daily Consular and Trade Reports" contains a warning to American tourists regarding the rule of the road in the province of New Brunswick.

According to Consul Botkin, of Campbellton, who wrote the report, a New Brunswick court recently decided that the custom of keeping to the left when meeting and to the right in passing, which obtains throughout the province, is "so old that the memory of man runneth not to the contrary and must be regarded as the law of the Province." The decision was handed down in a case in which the defendant had turned to the right on meeting another on the highway and had caused a collision. He was obliged to pay damages.

Road Improvement in British Columbia

In a paragraph devoted to road improvement in an article on "British Columbia's Industrial Progress," by Consul General David F. Wilber, published in the "Daily Consular and Trade Reports," it is stated that during last year a comprehensive program of road improvement work was decided upon and that large amounts will be spent during the present year.

The great extent of the province, the sparseness of its population, and, consequently, the great expense that must be incurred before it can have an adequate highway system, are not generally realized, it is stated. According to Mr. Wilber's figures, the expenditures on roads have amounted to over \$11,000,000 during the past ten years and have resulted in an additional road mileage of 7,000 miles. During the same period \$3,500,000 has been expended on bridges. At present the total length of all roads, on both the island and the mainland, is over 17,000 miles. An appropriation of \$5,000,000 has been made for this year for roads and bridges, and this, it is stated, may possibly be supplemented by a contribution from the Dominion government for one of the main highways.

Coming Meetings

Sept. 30—Oct. 5. — American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General News

A mass meeting in the interests of good roads will be held at Mammoth Cave, Ky., October 4 and 5.

Four new bridges appear in the budget prepared by the Department of Streets of Des Moines, Ia.

A good roads meeting held at Seebree, Ky., August 31st, was attended by about 200 farmers and business men of Webster County.

Automobilists of several towns in Bucks County, Pa., have formed an organization in the interests of improving the highways south of Doylestown, particularly those roads which are the main travelled highways into Philadelphia.

According to an estimate submitted by City Engineer Homer Hamlin the cost of improving Pacific Avenue and 14th Street, San Pedro, Cal., will be \$124,723.52. Of this amount the city is expected to contribute \$62,000, and the rest will be paid by the property owners.

The Acting Governor General of the Philippine Islands has released \$550,000 for roads and bridges in the Philippines from the annual appropriation and the unexpended balance of last year. Among the improvements projected is a new bridge to cost \$100,000, which is to be constructed at Laoag on the Manila north road.

Reports from the county commissioners, secretaries and county judges throughout Texas, show that approximately \$5,000,000 has been expended in constructing and improving the public highways since Jan. 1, 1912. Approximately 800 miles of roads have been built, and practically every county has improved its roads to some extent.

The voters of Shasta County, Cal., will be asked to decide upon the proposition of issuing \$1,270,000 in bonds, the proceeds of which will be used in building 107 miles of roads recommended by the County Highway Commission.

According to a statement in a recent issue of the "Daily Consular and Trade Reports," P. J. McDonnell, President of the Municipal Board of Manila, has appointed a committee of Manila citizens, headed by City Engineer Robinson to investigate the problem of bettering the condition of the streets of the city. In a letter of recommendation to the Municipal Board, Mr. McDonnell suggests that a provision for special assessment should be passed by the assembly and funds obtained in this way used in making permanent street improvements.

The Department of Communications and Public Works of the Mexican Federal Government has directed Eduardo Symonds, head of the Bureau of Inspection of Roads and Bridges, to confer with Governor Ramon Rosales of the state of Hidalgo on the subject of making early provision for completing the highway between Pachuca and Mexico City. Mr. Symonds was also directed to confer with the authorities of other cities in regard to extensive road improvement that will ultimately form a general system of improved highways to extend all through New Mexico.

A contract was recently placed with a firm in Glasgow, Scotland, for the construction of a large new highway and railway rolling lift bridge and approaches across the River Trent at Keadby, in Lincoln, England. The Sherzer Rolling Lift Bridge Company of Chicago, Ill., designed the superstructure, operating machinery and power equipment of the bascule span. The structure will be composed of two fixed approach spans in addition to the bascule span and the track girder span upon which the moving leaf rolls. The total length of steelwork will be nearly 500 feet. The roadway will be 24 feet wide.

Personal Notes

M. W. Elsner, Chief Engineer of Bridges, Berlin, Germany, died recently.

V. H. Hughes, E. M., has been appointed Assistant State Geologist of Missouri.

Frank LaF. Anders, who has been City Engineer of Fargo, N. D., since 1910, has been reappointed.

Frank L. Neill has been appointed

Assistant Chief of the Department of Highways and Street Cleaning, in charge of the Division of Street Cleaning of Philadelphia, Pa.

R. H. Cobb, Jr., has been appointed County Engineer of Hale County, Alabama. Mr. Cobb will be in direct charge of road work to be done under the recent \$100,000 bond issue.

C. R. Redfern has been appointed Roads Engineer of the Department of Works of Toronto, Ontario, succeeding A. A. Kinghorn, who has been appointed in charge of day labor construction throughout the city.

Henry H. Quimby has been reinstated as Assistant Engineer in the Survey Bureau in Philadelphia in charge of bridge construction. Mr. Quimby resigned his position several months ago.

Edward E. Betts, who recently resigned as County Engineer of Hamilton County, Tenn., has entered into private engineering practice under the style of Edward E. Betts Engineering Company, at Rooms 703 and 704 James Building, Chattanooga.

Davenport Bromfield, City Engineer of San Mateo, Cal., has been made Consulting Engineer in the \$1,250,000 highway project in San Mateo County, for which the supervisors will soon call a bond election. Mr. Bromfield will assist County Supervisor J. V. Neuman.

Trade Notes

A 32-page and cover pamphlet has been issued by the Holt Caterpillar Co., manufacturers of the Caterpillar traction engines at East Peoria, Ill. Illustrations show views of the machine from various angles, and many of its several parts appear in silhouette through the book. Other illustrations show the engine at work.

The Chicago Portland Cement Co., Chicago, Ill., is distributing a card descriptive of its method of sacking the company's AA brand of cement. The statement is made that the filling of the sacks is controlled by a mechanical device, the only one of its kind operated in this country, and that it insures absolute accuracy in weight per bag.

The Roemhelm Construction Co., of Chicago, Ill., will build a free steel bridge across the Arkansas River at Pine Bluff, Ark., the contract price being \$605,000. The Strauss-Bascule Co. of Chicago, will furnish the Strauss lift. The cost of the bridge will be \$45,000 less than the engineer's estimate. The bridge is to be of 7 spans, and with its approaches will be 3,000 ft. long.

CONTRACT NEWS

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ROADS AND STREETS.

Bids Asked and Prospective Work.

Birmingham, Ala.—The City Comn. has asked for bids to pave certain streets with wood. Address City Clerk.

Cullman, Ala.—Sealed bids will be received by the Court of County Commrs. of Cullman Co. until 11 a. m., Oct. 1, for grading, draining and macadamizing two roads near Cullman. Estimated expenditure, \$8,000. W. H. Keller is State Highway Engr.

Decatur, Ala.—Bids will be received by the Court of Co. Commrs. of Morgan Co. at the Court House, Decatur, Ala., until noon, Sept. 24, for clearing, grubbing, grading and draining the state aid road from Decatur to Hartselle. Estimated cost, \$8,000. W. S. Keller is State Highway Engr.

Coronado, Cal.—The City Bd. of Trustees will pave 12 streets throughout the city. Address City Clerk.

Imperial, Cal.—City Engr. I. B. Funk was instructed by the City Trustees to prepare specifications for paving Imperial Ave., from Sixth to Ninth St., and Eighth St., from the depot to H St.

Los Angeles, Cal.—The Chamber recommended that the Board of Supervisors levy 10c. on the \$100 of assessed valuation to build a coast road in connection with the Orange Co. beach towns and with the Los Angeles Co. Road. Between \$38,000 and \$39,000 will be expended on this road by the county.

San Francisco, Cal.—The Bd. of Pub. Works has granted permission for the performance of street work, under private contracts, at the following locations: Curbing, paving, etc., crossing or Cabrillo St. and 43d Ave.; curbing and paving Edinburg St., between Brazil and Persia Ave.; grade, curb and pave Cassell Ave., between Danvers St. and Palou Ave.; curb and pave Laussat Ave., between Buchanan and Webster St.; curb, pave, etc., crossing of 17th Ave. and Cabrillo St.; curb and pave 21st St., between Sanchez and Noe Sts.; curb and pave 17th Ave., between Cabrillo and Fulton Sts.; curb and pave 17th Ave., between Balboa and Cabrillo Sts., also 17th Ave., between Anza and Balboa Sts.

Macon, Ga.—Sealed bids will be received by P. L. Hay, Chmn. of the Comm. on Streets, until noon, Sept. 17, for paving Forsyth St. between College and Monroe Sts. with concrete, consisting of one part best Portland cement, two parts clean sand and four parts crushed granite, according to specifications to be furnished on application to the City Engr.

Moscow, Id.—Sealed bids will be received by the City Clk. of Moscow until Sept. 21 for extensive paving of various kinds on the streets of the city. Specifications are filed in the office of the City Engr. and the City Clk. The district to be paved comprises about 70,000 sq. yds.

Effingham, Ill.—The Bd. of Loc. Imps. of the city of Effingham has adopted resolutions recommending seven new paving districts, the paving to cost \$42,199. Address City Clerk.

Joliet, Ill.—Sealed proposals will be received by Wm. S. Welch, City Clk. of Joliet, until 10 a. m., Sept. 16, 1912, for the improvement of Glenwood Ave. by the construction of a macadam pavement. Specifications are on file in the office of the City Engr.

Bids will be received until 10 a. m., Sept. 16, for the improvement of Jackson St. by the construction of bituminous pavement. Specifications are on file in the office of the City Engr.

Pekin, Ill.—The Bd. of Loc. Imps. has rejected all bids for the paving of Court St. and will advertise for new bids. Address City Clerk.

Rockford, Ill.—Ordinances have been passed for the grading of several streets, the macadamizing of Summitt St., and for laying two sidewalks.

E. State St. will be paved a portion of the distance with brick and for the rest of the street macadam will be used, as agreed by the Bd. of Loc. Imps.

Rock Island, Ill.—The Bd. of Loc. Imps. has recommended that sidewalks be laid along the north and south sides of Seventh Ave. between 30th and 38th Sts.

The City Council has passed an ordinance providing that sidewalks be laid about the Joe Rosenfield property at the corner of Seventh Ave. and 17th St.

Tipton, Ind.—Bids will be received Sept. 16 for the construction of a 6-ft. cement sidewalk on both sides of Jefferson St. Address Clyde Howard, City Clerk.

Vincennes, Ind.—City Engr. Hershey has filed an estimate on the improvement of Nicholas from First to Eleventh Sts., totalling \$4,784.23.

Des Moines, Ia.—Sealed proposals will be received by the City Council at the office of the City Clk., in City Hall, until 9 a. m., Sept. 18, for the following street work: Paving with either No. 1 vitrified paving brick with tar filler or sheet asphalt, consisting of one and one-half inches of wearing surface and one inch binder course of Warren's Bitulithic, consisting of two inches wearing surface. Work comprises about 4,317 sq. yds. of paving in W. 22d St., from paving now in place near the north line of University Ave. to paving now in place near the south line of Forest Ave.

Louisville, Ky.—Sealed bids will be received until Sept. 16 for vitrified block street work on Brook St. from Avery to G St., Floyd St. from the south line of the Southern Railway to the city boundary line on the south.

Bids will be received at the same time for the construction of granitoid sidewalks on portions of the following streets: 26th, St. Catherine, Market, 27th, 18th, Fulton, Hull and Preston Sts., Brandeis Ave., Burnett and Greenwood Aves.

New Orleans, La.—It is said that the Texas & Pacific Railroad will expend about \$250,000 in paving certain streets in the vicinity of the proposed depots and terminals of the company.

Malden, Mass.—The City Council has appropriated \$9,000 for widening Salem St. near Maplewood Square.

Detroit, Mich.—Sealed proposals will be received until 8 p. m. at the office of the Vil. Clk., until Sept. 16, for paving Tyler, Grand and Cortland Aves., according to plans and specifications on file in the office of the Village Engr. at 20 Gerald Ave., Highland Park.

Hannibal, Mo.—The City Council has passed a resolution providing for the

re-paving of Section St. with concrete from Bird St. to Paris Ave.

New York, N. Y.—Sealed bids will be received by Geo. McAneny, Pres. of the Boro. of Manhattan, at Room 14, City Hall, until 2 p. m., Sept. 18, 1912, for the following street work: For regulating and repaving with wood block pavement on a concrete foundation the roadway of Fulton St., from west side of Broadway to east side of West St.; for regulating and repaving with special granite block pavement on a concrete foundation the roadway of Fulton St., from west side of Broadway to east side of West St.

Sealed bids or estimates will be received by the Pres. of the Boro. of Brooklyn at his office in Boro. Hall, until 11 a. m., Sept. 18, 1912, for regulating and repaving with asphalt block on a concrete foundation the roadway of 7th St., from 8th Ave. to Prospect Park West; for regulating, grading, curbing and laying sidewalks on Wakeman Pl., from 1st Ave. to 3d Ave.

Solvay, N. Y.—Sealed bids will soon be received by the town superintendent of the town of Geddes at the Town Hall, Solvay, for the reconstruction of a town road, known as Bridge St. extension, a length of about 900 ft. Plans, specifications and directions to bidders are on file at the office of the County Superintendent of Highways at the Court House. John A. Palmer is Town Sup't.

Akron, O.—An ordinance was passed to levy special assessments for the improvement of Casterton Ave. from Market St. to Ely St. by grading, curbing and paving, and constructing sidewalks on both sides thereof, and to issue bonds in anticipation thereof.

An ordinance was passed determining to proceed with the improvement of Woodland Ave. from Balch St. to Gale St. by grading, curbing, paving and constructing sidewalks.

An ordinance was passed to levy special assessments for the improvement of May St. from Russell Ave. to Campbell St. by grading, curbing and paving, constructing sidewalks, and to issue bonds in anticipation thereof.

Alliance, O.—An ordinance was passed, determining to proceed with the improvement of Ridgewood Ave. from south line of State St. to south corporation line, by grading, draining, curbing and paving with brick block.

Bryan, O.—An ordinance was passed determining to proceed with the improvement of Mulberry St. from the east line of Union St., by paving, curbing and draining the same.

An ordinance was passed determining to proceed with the improvement of West High St. from the west side of alley between Beech St. and Portland St. to the west corporation line, by curbing, paving and draining the same.

An ordinance was passed determining to proceed with the improvement of Center St. from the west line of Beech St. to the west corporation line, together with the intersection of Beech and Center Sts., by paving, curbing and draining the same.

Cincinnati, O.—Sealed proposals will be received at the office of the Director of Pub. Wks. until noon, Sept. 17, for the improvement of Charlton St. between Scioto and Dennis Sts., by grading, setting granite curbs, paving the roadway with plain macadam and the gutters with concrete, and constructing the necessary drains and inlets. Plans, specifications and blank proposals are on file at the office of the Chief Engr., Dept. Pub. Service.

Sealed proposals will be received until noon, Sept. 17, for the improvement of the slide on the north side of Elberon Ave. west of Maryland Ave. by erecting a Cyclopean concrete retaining wall and driving piles necessary to prevent further slide of the hill.

An ordinance has been passed determining to proceed with the improvement of Hester St. between Western and McLean Aves. by grading, setting stone curbs, paving the roadway with stone block pavement and constructing the necessary drains, inlets and retaining walls.

An ordinance has been passed determining to proceed with the improvement of Innes Ave. between Bruce and Frederick Aves. by grading, setting stone curbs, paving the roadway with brick and constructing the necessary drains and retaining walls.

An ordinance has been passed determining to proceed with the improvement

of Sauer Ave. from Warner St. to a point 200 ft. south of Parker St. by grading, laying cement combined curb and gutter and paving the roadway with brick.

An ordinance has been passed determining to proceed with the improvement of Diamond Alley from Rochelle St. to its northern terminus by grading, paving the roadway its full width with brick, and constructing the necessary drains and inlets.

An ordinance has been passed determining to proceed with the improvement of Evergreen Ave. between the east line of Cheviot St. and the west line of Craig Ave. by grading, setting cement curb and gutter, macadamizing the roadway with a bituminous binder, and constructing the necessary drains and inlets.

An ordinance has been passed determining to proceed with the improvement of Court St. between Sycamore St. and Broadway by grading, setting granite curbs and paving the roadway with granite block pavement.

An ordinance has been passed determining to proceed with the improvement of Snabley Alley from Church St. east and west by paving with concrete.

An ordinance has been passed determining to proceed with the improvement of Neave St. from W. Sixth Ave. to Staebler St. by grading, setting granite curbs and paving the roadway with granite block pavement.

An ordinance has been passed determining to proceed with the improvement of Knox St. from Thompson Ave. to Saturn St. by grading, setting stone curbs and paving the roadway with brick between Thompson Ave. and Scully St. and with bituminous macadam from Scully St. to Saturn St. and constructing drains and inlets.

An ordinance has been passed determining to proceed with the improvement of Colerain Ave. between Bank St. and Harrison Ave. by grading, setting stone curbs and paving the roadway with stone block pavement.

An ordinance has been passed determining to proceed with the improvement of Iowa St. from McGregor Ave. to its southern terminus by constructing cement curb and paving the roadway with bituminous macadam.

An ordinance has been passed determining to proceed with the improvement of W. Eighth Ave. from the west line of old St. Joseph's Cemetery to the new St. Joseph's Cemetery, by grading, setting granite or Medina sand stone curbs, paving the gutters with brick, macadamizing the roadway with special binder and finishing course, and constructing the necessary drains, inlets and retaining walls.

An ordinance has been passed determining to proceed with the improvement of Denver Ave., formerly Neft Ave., from Wilder Ave. to Maxwell Pl. by grading, laying concrete gutters, paving the roadway with bituminous macadam and constructing drains, inlets and retaining walls.

An ordinance has been passed determining to proceed with the improvement of Liberty St., from a point 120 ft. west of the west curb of Mans Ave., to the east curb of Rosemont Ave., by grading, setting granite curb, paving the roadway with hillside brick and constructing the necessary drains and inlets.

An ordinance has been passed determining to proceed with the improvement of Twelfth St., from Central Ave. to Plum St., by paving the roadway with wood block between rails and with brick two feet outside of rails and the balance of the roadway with asphalt.

An ordinance has been passed determining to proceed with the improvement of Wingate Alley from Cutter St. to Jane St. by paving with brick.

Sealed proposals will be received at the office of the Bd. of Co. Comrs. of Hamilton Co. until noon, Oct. 4, for the improvement of the Union Cemetery road, between the Loveland and Madera road and the Montgomery Pike in Symmes Twp. Plans and specifications are on file in the office of the Co. Comrs. Stanley Struble is Pres. of the board.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Commissioner at Columbus, O., until 2 o'clock p. m., September 26, 1912, for grading and paving with a bituminous surface treated concrete the Scioto road, in North and Rumley Twps., Harrison Co. Length, 13,600 ft. or 2.58 miles; width, 10 ft.; estimated cost of construction, \$23,825.58. Plans and specifications are on file in the office of the Co. Cmr. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, O., until 2 o'clock p. m., Sept. 20, 1912, for grading and paving with a bituminous surface treated con-

crete the Scotland Station, Easterly road in Chester Twp., Geauga Co. Length, 5,800 ft., or 1.10 miles; width, 14 ft.; estimated cost of construction \$9,612.73. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, O., until 2 o'clock p. m., Sept. 20, 1912, for grading and paving with brick for medium traffic, the Chester road in Chester Twp., Meigs Co.; length, 5,280 ft., or 1 mile; width, 10 ft.; estimated cost of construction, \$10,598.70. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, O., until 2 o'clock p. m., Sept. 20, 1912, for grading and paving with brick for medium traffic the Nelsonville Athens Ext. road, Athens Co. Length, 7,824 ft., or 1.48 miles; width, 16 ft.; estimated cost of construction, \$17,209.59. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, O., until 2 o'clock p. m., Sept. 20, 1912, for grading and paving with brick for heavy traffic the Canton Waynesburg road, in Canton Twp., Stark Co. Length, 7,116 ft., or 1.35 miles; width, 16 ft.; estimated cost of construction, \$22,930.31. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, O., until 2 o'clock p. m., Sept. 20, 1912, for grading and paving with brick for medium traffic the Caldwell and Sharon road, in Olive Twp., Noble Co. Length, 5,280 ft., or 1 mile; width, 14 ft.; estimated cost of construction, \$16,472.60. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Department.

Dayton, O.—The Co. Comrs. of Montgomery Co. have passed resolutions determining to improve the Springfield pike in Madriver Twp. Estimated cost, \$17,400 for bituminous macadam, \$25,400 for bituminous concrete and \$14,700 for the use of slag.

Follansbee, O.—The Follansbee Council has made arrangements to finish up the paving of all unimproved streets of the village in accordance with the petition signed by the property owners on the streets. The streets will be graded, sewered and paved and bonds will be issued to cover the cost of the improvement.

Girard, O.—Sealed bids will be received by the council of the village of Girard at the office of the Village Clk. until noon, Sept. 23, for furnishing the necessary labor and material for the construction of storm water sewers.

Toledo, O.—An ordinance was passed determining to proceed with the improvement of Redwood Ave., from Bowman St. to Congress St., by grading and paving.

Waukegan, O.—Bids will be received Sept. 17 for the improving of county road No. 60, commencing at Power's Corners in Gorham Twp. All bids required to be made upon grading, draining, furnishing, hauling, placing and rolling stone or slag with stone screenings. This improvement will be sold in sections of one mile in length. Address C. J. Ives, Aud.

Oklahoma City, Okla.—A resolution has been adopted by the Bd. of Comrs. of the City Council, declaring it necessary to pave Central Ave., from First St. to Second St., and to do the necessary grading, construct manholes and curb inlets and put in drain pipes, lateral storm sewers, curbs and to reset curbs.

Lock Haven, Pa.—South Fairview St. will be paved with brick.

Reading, Pa.—An ordinance has been passed authorizing the grading, paving, macadamizing and otherwise improving of Fairview Ave., from Trent Ave. to Penn Ave. Bids will be received on macadamized paving with brick, stone, Telford or other suitable material, which may be selected by the Street Comm. of the Town Council. Ferdinand Thun is president of the council.

Austin, Tex.—Bids will be received by the City Council until Sept. 26 for paving Lavaca and 19th Sts. and University Ave., comprising a total of sixteen blocks.

Dallas, Tex.—The Bd. of Mun. Comrs. adopted resolutions instructing the Secy. to advertise for bids for paving of five streets. Address City Clerk.

Temple, Tex.—The Chamber of Commerce has outlined a plan for paving of all the principal residence streets of the

city to the city line, and in the near future a bond issue amounting to \$100,000 will be asked for.

Haraboo, Wis.—Plans for paving 5th and 3rd Aves. were approved by the Council. Address City Clerk.

Green Bay, Wis.—Bids will be received Sept. 17 for the furnishing of all material and doing all of the work necessary to improve alleys by paving with a concrete foundation. Address City Clk.

La Crosse, Wis.—Sealed bids will be received by the Bd. of Pub. Wks., until 2 p. m., Sept. 17, for furnishing work and materials for improving with brick pavement and making other improvements, the alley between Second and Third Sts., extending from Jay to King Sts. The work amounts to approximately 200 cu. yds. of grading, 450 ft. of concrete headers and 685 sq. yds. of brick paving.

Bids Received and Contracts Awarded.

Talladega, Ala.—The contract for the construction of six miles of state aid road between Talladega and Mardisville in Talladega Co., has been awarded to A. T. Bearden, of Birmingham, at \$12,000.

Helena, Ark.—The lowest bid for paving work in the city of Helena was \$32,000, submitted by the Southern Bitulithic Co., of Nashville, Tenn.

Alhambra, Cal.—J. M. Montgomery was awarded the contract for improving Ramona Blvd., between Sixth St. and Garfield Ave., at 25 cts. lin. ft. grading, 20 cts. curb, 11 cts. sq. ft. gutters, 2½ cts. sq. ft. paving.

Colton, Cal.—B. C. Nichols, 2126 Ellendale Ave., Los Angeles, was lowest bidder at \$30,194.27 for improving portions of Eighth and J Sts. The work consists of approximately 18,000 sq. yds. of asphalt paving and 2,200 sq. yds. concrete gutters and concrete-cement entrances, and 500 lin. ft. of corrugated iron culverts. The Fairchild-Gilmore-Wilton Co. bid \$31,422.67 and Barber Asphalt Paving Co. \$32,761.13.

Eagle Rock, Cal.—Robert P. Law, 1458 La Prada Park, has the contract at \$15,600 for the construction of curbs, sidewalks and eighteen concrete culverts along Valley Drive. Wm. F. Bixby, Mason Bldg., is City Engr.

Los Angeles, Cal.—The Fairchild-Gilmore-Wilton Co. was low bidder for improving Boyle Ave., from Stephenson to Seventh St., etc., at 16.7 cts. per sq. ft. asphalt paving, 35 cts. per lin. ft. cem. curb, 30 cts. per sq. ft. vit. blk. gutter, 40 cts. per sq. ft. granite blk. gutter, 12 cts. for sidewalk, \$1,062 for storm drains complete. The Barber Asphalt Paving Co. bid 18.3 cts. asphalt, 40 cts. curb, 33 cts. vit. blk. gutter, 46 cts. granite gutter, 12 cts. sidewalk, \$1,160 storm drains.

Sacramento, Cal.—The following contracts have been awarded for the construction of 56 miles of roadway in Madera, Fresno, Stanislaus, Merced and San Diego Counties: An asphaltic oil road in Madera Co., from the Merced Co. line to a point one mile south of Califa, 6.8 miles, to the Worswick Street Paving Co., of Fresno, at \$31,831.50; in Madera Co., an asphaltic oil road, from the Fresno Co. line to Madera City, 9.9 miles, to the Worswick Street Paving Co., at \$45,557.50; in Merced Co., an asphaltic oil road from the Stanislaus Co. line to Arena, 9.6 miles, to the Worswick Street Paving Co., \$50,343.50; in Fresno Co., an asphaltic oil road from Fresno to the Madera Co. line, 9.6 miles, to the Worswick Street Paving Co., at \$42,268.60; in Stanislaus Co., an asphaltic oil road from the southern boundary of the county to a point one and a half miles north of Ceres, to E. O. Burge, of Sacramento, at \$57,773.50; in San Diego Co., an asphaltic oil road, from San Diego to Encinitas, 8.6 miles, to M. L. Curtis & Co., of South Pasadena, at \$49,434.80.

San Diego, Cal.—Ford & Stout, Bradbury Bldg., Los Angeles, were awarded the contract for paving India St., between H. and Winder Sts., at \$94,846.35. The work consists of asphalt paving, granite gutters, concrete curbs, grading, reinforced concrete culverts and cement culverts and catch basins. Other bids were \$100,629.13 by the Barber Asphalt Paving Co., and \$103,358.30 by the Fairchild-Gilmore-Wilton Co.

C. H. Tingley was awarded the contract for grading 31st and Grape Sts., at \$5,915.11.

Sawtelle, Cal.—David Joy, 709 Higgins Bldg., Los Angeles, was awarded contracts at a total of over \$9,000 for improving portions of Eighth St. (total distance, 1,183 ft., \$4,456.15), and Amherst St. (total distance about 1,600 ft., \$5,802.24), the work consisting of grading,

crushed rock and oiling, cement curbs, gutters and sidewalks.

Upland, Cal.—The Fairchild-Gilmore-Wilton Co. was awarded the contract for improving Second St. between Eleventh and A. Sts. as follows: Asphalt paving, per sq. ft., 16.7 cts.; concrete gutter, per sq. ft., 11 cts.; curb, per lin. ft., 30 cts.; gutter, per sq. ft., 35 cts.

Venice, Cal.—Pearson & Anderson of Venice were awarded the contract for the construction of a concrete bulkhead and stairway on the Ocean Front and Strand at \$5.50 per lin. ft.; total, \$28,029. Other bids were Galley & Clark, \$33,000; Braun, Bryant & Austin, \$36,000.

Peoria, Ill.—The Bd. of Local Imps. has awarded the contract for the paving with brick of Arcadia Ave. between North St. and Pacie Ave., to A. D. Thompson at \$40,351.90. The contract for paving Fourth Ave. between Spencer St. and Seventh Ave. was awarded to Canterbury Bros., at \$14,799.40.

Rock Island, Ill.—The Bd. of Local Imps. has received the following low bids for street work: For paving 20th St., between First and Second Aves., with brick, McCarthy Improvement Co., \$2.00 per sq. yd.; paving 19th St., between Second and Third Aves., with brick, McCarthy Improvement Co., \$2.00 per sq. yd.; paving 24th St., between Third and Fifth Aves., Independence Constrn. Co., \$2.00 per sq. yd.

So. Bend, Ind.—The Co. Comrs. of St. Joseph Co. have awarded the contract for the improvement of the E. J. Whitmer Rd. in German Twp., to H. W. Reed & Son of Mishawaka, at \$8,495.

Vincennes, Ind.—The Bd. of Pub. Works has awarded the contract for the improvement of Bayou St. from Third to 11th Sts. to George W. Foulkes of Terre Haute, at \$3,163.62. W. H. Moore & Son bid \$4,340.49.

Clarion, Ia.—The contract for the construction of 15,000 sq. yds. of Bitulithic pavement has been awarded to the Des Moines Asphalt Paving Co. of Des Moines, at \$1.96 per yd.

Wichita, Kan.—The contract for paving three blocks on Hillside Ave. has been awarded to John Ritchie & Son at 36 cents for excavation and \$1.67 for brick cement filled pavement. The contract for constructing the curb was awarded to Myers & Newcomb at 22 cents per lin. ft.

Baltimore, Md.—The Bd. of Awards has approved the recommendation of the Paving Commission to award the contract for sheet asphalt paving to Robert Padgett at \$1.68 per sq. yd.

The contract was awarded by the Bd. of Trade for paving of Orem Ave., Parkwood Ave. and Woodbrooks Ave. to the F. E. Schneider Paving Co., at \$11,843.50.

St. Paul, Minn.—The Bd. of Pub. Works has received the following bids for paving: Sixth St., between Sibley and Rosabelle Sts., General Constrn. Co., Minneapolis, sandstone, \$8,926; creosote blocks, tamarack or Norway pine, \$8,526; creosote blocks, yellow pine, \$9,019; resurfacing with asphalt, \$5,079; concrete work to reinforce old foundation, \$5.50 per cu. yd., or \$1,000. Fielding & Shepley, St. Paul, creosote blocks, yellow pine, \$8,926; sandstone, \$9,080.

Biloxi, Miss.—The contract for the construction of two and a half miles of shell road between Ocean Springs and the west gate of the Rose Farm has been awarded to N. E. Latimer & Son of Biloxi at \$6,695.50.

Forest, Miss.—The Road Comrs. have awarded the contract for the construction of 8½ miles of gravel road to the Healy Constrn. Co. of Meridian, Miss., at \$27,153.71. Four miles of this road will be built from Forest north and four and one-quarter miles from Forest south.

Meridian, Miss.—The contract for building 24 miles of sand clay roads in District No. 5, Lauderdale Co., for which bids were opened Sept. 3, was awarded to the Healy Constrn. Co. of Meridian, at \$44,777.50. W. P. Moore is Engr.

Vandalia, Mo.—The City Council of Vandalia has let the contract for paving eight blocks of Main St. to the Illinois Constrn. Co. of Springfield, Ill. The cost will total \$21,000.

Albany, N. Y.—The following low bids for the improvement of public highways by state aid were received by the State Comr. of Highways Sept. 9: Highway No. 5365, John Kelly of Syracuse, \$94,869.15; highway No. 5312, Falk & Menzies, Buffalo, \$87,483.77; highway No. 5339, Albert L. Willy, Binghamton, \$22,862.25; highway No. 1106, N. E. Young, Windsor, \$57,159; highway No. 5217, Ma-

honey & Swanson, Jamestown, \$70,037; highway No. 5263, Mahoney & Swanson, \$49,640.95; highway No. 5197, Bluff Point Stone Co., Plattsburg, \$14,816.25; highway No. 5228, John D. Sullivan, Keeseville, \$21,293; highway No. 5347, Russo-Parker Constrn. Co., Hudson, \$42,988; highway No. 5343, Bridgeport Constrn. Co., Poughkeepsie, \$126,491.73; highway No. 5333, H. B. Cooper, Albany, \$18,157.48; highway No. 5384, Gruner & Hollenbeck, Harriman, \$61,933.95; highway No. 5326, Part 2, Samuel Beskin, Fishkill, \$39,443.50; highway No. 5367, Wm. P. McDonald Constrn. Co., Mt. Vernon, \$72,061.50; highway No. 5369, Russo-Parker Constrn. Co., \$17,307.25; highway No. 5332, M. R. Klock & Co., Watertown, \$141,959.30; highway No. 5327, Newport Constrn. Co., Herkimer, \$139,448.40; highway No. 5329, Mosler & Summers, Buffalo, \$102,973.45; highway No. 5319, S. V. R. Malcolm & Son, Medina, \$49,647.50; highway No. 5381, Mitchell & Wilson Co., Niagara Falls, \$3,300; highway No. 5346, Betts & Boyce, Brown Station, \$62,661; highway No. 5325, Winston & Co., Brown Station, \$150,437.65; highway No. 5328, Suffolk Constrn. Co., Huntington, \$146,879; highway No. 5250, Thomas Grady, Rochester, \$85,538.20; highway No. 5354, H. Karr, Troy, \$57,621.50; highway No. 5342, Swank & McIntyre, Buffalo, \$23,646.36; highway No. 5249, part 3, John C. Bradley Co., Corning, \$51,787.45; highway No. 5351, McGuire & Fahey, Hornell, \$10,994; highway No. 5353, McGuire & Fahey, \$4,414.20; highway No. 5334, Cornett & Gilbert, Watkins, \$78,100; highway No. 5301, Chas. B. Pratt, Port Jefferson, \$240,566; highway No. 5379, F. B. Meckers, Long Pond, Pa., \$43,748.40; highway No. 5316, A. C. Davis, Schenectady, \$25,931.50; highway No. 5321, Wm. F. McCabe Constrn. Co., White Plains, \$10,713.30; highway No. 5357, Hastings Paving Co., New York City, \$30,466.50; highway No. 5358, Wm. P. McDonald Constrn. Co., Mt. Vernon, \$9,861.40; highway No. 5359, H. J. Mullen, Jamaica, \$99,729; highway No. 5260, Saml. Beskin, Fishkill, \$51,982; highway No. 5361, Jos. L. Couzzo, Yonkers, \$12,297; highway No. 5362, Fangnani & Saxton, Tuckahoe, \$2,398.50; highway No. 5363, H. B. Sproul, Peekskill, \$32,423; highway No. 5364, H. B. Sproul, \$16,717.20; highway No. 5324, Lane Constrn. Co., Meriden, Conn., \$114,829.70.

The following low bids for the improvement of public highways were received by the State Comr. of Highways, Sept. 10, 1912: Highway No. 5341, Falk & Menzies, Buffalo, \$56,027.30; highway No. 5377, Albert L. Willy, Binghamton, \$38,733.25; highway No. 1095, John H. Gordon, Albany, \$43,693.88; highway No. 5259, Mahoney & Swanson, Jamestown, \$85,847.23; highway No. 5245, Dunkirk Constrn. Co., Dunkirk, \$53,394.30; highway No. 5320, L. W. Schultz, Fredonia, \$34,662.80; highway No. 5199, S. B. Van Wagoner, Rondout, \$82,691.57; highway No. 5337, John D. Sullivan, Keeseville, \$27,665.50; highway No. 5340, Merritt Constrn. Co., Tuckahoe, \$62,494.37; highway No. 5366, Wm. P. McDonald Constrn. Co., Mt. Vernon, \$14,052; highway No. 5368, Russo-Parker Constrn. Co., Hudson, \$39,723.50; highway No. 5370, D. H. Craw, Ravenna, \$27,950.95; highway No. 5344, John H. Nelson & Co., Herkimer, \$47,574.25; highway No. 5330, Paddleford & King, Sherburne, \$68,644.85; highway No. 5360, Dale Engr. Co., Utica, \$25,937.61; highway No. 5345, John E. Consalus, Albany, \$56,400; highway No. 5318, C. F. Sullivan, Syracuse, \$33,483.40; highway No. 5323, J. W. Brennan, Geneva, \$94,649.82; highway No. 5315, Falk & Menzies, Buffalo, \$72,543; highway No. 5383, J. A. Caiken & Co., Oswego, \$142,991.68; highway No. 5313, Lang & Horton, Schuylerville, \$44,917.50; highway No. 5286, Spuyten Duyvil Constrn. Co., New York City, \$42,910.75; highway No. 5335, McGreevy, McGuigan & Baum, Elmira, \$54,677.40; highway No. 5331, Byrnes & McConville Cont. Co., Ogdensburg, \$21,133.25; highway No. 5348, Shaughnessy Constrn. Co., Albany, \$139,736.61; highway No. 5352, Atlanta Constrn. Co., Atlanta, \$135,790.80; highway No. 5232, Standard Bitulithic Co., New York City, \$222,734.80; highway No. 5322, part 2, John E. Consalus, Albany, \$87,603.50; highway No. 5333, Lane Constrn. Co., Meriden, Conn., \$34,395; highway No. 5336, Wm. C. Fox, Saratoga Springs, \$110,767.50; highway No. 1092, Lang & Horton, Schuylerville, \$65,135.10; highway No. 5371, Warren Bros. Co., Boston, Mass., \$48,303.50; highway No. 5372, Warren Bros. Co., \$35,498.10; highway No. 5373, Hastings Paving Co., New York City, \$74,170.70; highway No. 5374, Warren Bros. Co., \$5,739; highway No. 5375, Hastings Paving Co., \$28,383.30; highway No. 5376, Samuel Beskin & Co., Fishkill, \$67,707; highway No. 5355, Con-

necticut, Hassam Paving Co., New Haven, Conn., \$41,330; highway No. 5356, Samuel Beskin & Co., \$73,128.50; highway No. 5378, Thomas Bucknall, Albion, \$47,354.11.

Little Falls, N. Y.—The contract for paving and curbing S. Anna St., between the north side of John St. and the south side of Main St., has been awarded to Hellman Bros., at \$5,300 for paving and 90 cents per foot for straight curb and \$1.25 for circular curb.

New York, N. Y.—The contract for regulating, grading, curbing, flagging and paving with improved granite block on a concrete foundation, Covert Ave., Ridge-wood, from De Kalb Ave. to Putnam, and from Cornelia St. to Myrtle Ave., has been awarded to the Cannon Engg. Co., at \$96,570.

Columbus, O.—The following contracts has been awarded by James R. Marker, State Highway Commissioner, for road work: Grading and paving with bituminous bounded macadam, the Monroe Turnpike Road in Lucas Co., length, 10,807.5 ft., 16 ft. wide, to John D. Ramer, Toledo, O., at \$31,925; for grading and paving with waterbound macadam the Jackson and Piketon Road in Jackson Co., length, 11,871 ft., 10 ft. wide, to W. J. Kuhner of Wellston, at \$5,480.40; for grading and paving with waterbound macadam the Jackson-Richmondale Road in Jackson Co., length 5,645 ft., 14 ft. wide, to Keller & Lungsford, Pedro, at \$3,951.50; for grading and paving with waterbound macadam the Jackson-May-bee road in Jackson Co., length, 7,235 ft., 10 ft. wide to H. E. Hunt of Jackson, at \$4,965; for grading and paving with waterbound macadam the Jackson-Chillicothe Road in Jackson Co., length, 5,985 ft., 10 ft. wide to J. P. Long, Centerburg, at \$3,862; for grading and paving with waterbound macadam the Jackson-Centerville Road in Jackson Co., length, 4,665 ft., 10 ft. wide, to Keller & Lungsford, at \$3,100; for grading and paving with bituminous surfaced concrete the Chillicothe Jackson Road, Ross Co., length, 5,280 ft., 16 ft. wide, to Jardine, Brewer & Tomlinson, Chillicothe, at \$11,518.62; for grading and paving with a bituminous bound macadam the Upper Sandusky Road in Marion Co., length, 5,750 ft., 10 ft. wide, to Jardine, Brewer & Tomlinson, at \$11,518.62.

Providence, R. I.—The contract for paving Academy Ave. has been awarded by the Bd. of Contract and Supply to the Narragansett Improvement Co. of Providence for \$23,785.32 for a wearing surface laid on a concrete foundation with the addition of a one-inch binder.

The contract for supplying 200,000 bricks has been awarded to Manchester & Hudson, Providence, at \$9.08 per thousand.

Memphis, Tenn.—The following contracts have been awarded by the Bd. of City Comrs. for street work: Paving South Bellevue Blvd., from E. Agnes Pl. to the Frisco Railroad, with concrete, to Roach & Manigan Paving Co., \$5,911. Drainage work in Lamar Ave., from East St. to Snowden Circle, F. D. Harvey, \$1,718. Paving Third St., between Union and Adams Aves., with wood block, M. E. Larkin, \$14,747.08.

Dallas, Tex.—The City Commission has awarded the contract for paving Terrell Ave., from S. Main St. to Hemphill St., with Bermudez bituminous concrete to Roach & Manigan, at \$1.75 per sq. yd.

Houston, Tex.—The contract for paving Houston Ave. with brick was awarded by the City Council to Horton & Horton on their bids of \$12,621.15. The contract will carry with it a five-year guarantee.

Temple, Tex.—The City Council of Temple has awarded the contract for paving Central Ave., between Second St. and the Missouri, Kansas & Texas Railway passenger depot, with vitrified brick to J. A. Gregory, of Dallas, at \$2.10 per sq. yd. for paving and 35 cents per foot for curbing with concrete. Total, \$26,380.25.

BRIDGES.

Bids Asked and prospective Work.

Little Rock, Ark.—The sketch of the plans for the proposed West Third St. viaduct has been received by Supt. of Pub. Works Henry Levinson. The detailed plans and specifications will be forthcoming within a few days, and bids may be asked for within two weeks.

Yuba, Cal.—Thomas & Post, bridge engineers, Hibernian Bldg., Los Angeles, have prepared plans for an 800-ft. reinforced concrete bridge to span the Yuba

River at Parks Bar. Yuba Co. also plans for five smaller bridges ranging in length from 100 to 400 ft. each. Also for a 650-ft. concrete bridge to be erected at Monterey, Sonoma Co. The Thomas system of bridge construction will be used.

Dover, Del.—The Kent Co. Levy Court has authorized Comr. Kleth to advertise for bids for building a bridge in the Second Dist. over Hamm's Branch, the cost not to exceed \$500. Address Kent Co. Clerk.

Wilmington, Del.—Sealed proposals will be received at the office of the Co. Engr. of Newcastle Co. until noon, Sept. 17, for the work and material necessary to reinforce the new bridge at the foot of Rising Sun Lane, near the Brandywine Creek. Plans and specifications are on file at the office of the Co. Engr.

Lewiston, Id.—The City Council has decided to construct a steel bridge across the Clearwater River at 18th St.

Muscatine, Ia.—City Engr. Charles Young is preparing plans for a combination interurban and street traffic bridge spanning Mad Creek on Isett Ave. According to the plans now being drawn the new bridge will be wider than the present structure and will also be shorter. The steel girders and other material in the present bridge will be used in the new structure, which will also have a concrete floor.

Mankato, Kans.—Bids will be received Sept. 17 for the purpose of constructing and repairing bridges. Address Jewell Co. Clerk.

Orono, Me.—Plans have been prepared for a steel bridge to be erected across the Stillwater River. Address Town Clerk.

South Wales, N. Y.—It has been voted to build an iron bridge with concrete driveway, 95 ft. long, over the Buffalo Creek, on the highway midway between Strykersville and Wales. Estimated cost \$5,100.

Cincinnati, O.—Sealed proposals will be received at the office of the Bd. of Co. Comrs. of Hamilton Co. until noon, Sept. 27, 1912, for the construction of bridges and culverts on the Batavia Pike from the Ohio Pike to the county line, in Anderson Twp. Address Albert Reinhardt, Clerk of the Bd.

Cleveland, O.—Bids will be received Oct. 5 for the construction of bridge work per report No. 2999, concrete culverts, in Brook Park Extension, Parma and Brooklyn Twps.

Bids will be received Sept. 28 for the construction of bridge work per report No. 2995, concrete arch over Chagrin River at bag factory, in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Cuyahoga Co. Surv. Address John F. Goldenbogen, Clerk.

Bids will be received Sept. 28 for the construction of a balustrade for concrete bridge over Nine Mile Creek, Lake Shore Blvd. Address John F. Goldenbogen, Clerk.

Elyria, O.—Bids will be received Sept. 19 for furnishing material and performing all necessary labor for constructing a sub-structure for the Cox Bridge, in Elyria Twp., located on the Abbe Road, about two miles north of Elyria, in accordance with plans and specifications furnished by T. L. Gibson. Address F. L. Ellenberger, Clerk.

Pittsburgh, Pa.—Only one bid was received for the construction of the Murray Ave. bridge over the William Pitt Blvd. This was above the estimate of the engineers in the Dept. of Pub. Works, and the bid was rejected and a new advertisement prepared.

Bristol, Tenn.—Residents of Johnson Co. have made a subscription of \$1,000 for the construction of a bridge over the Holston River, between Sullivan and Johnson Counties.

Houston, Tex.—Four concrete bridges, one of them planned for streets not at present connected, are among the proposed improvements when the recently voted bond issue is available. Plans for the three bridges have been in preparation for several months and the plans for the fourth are now being worked out by City Engr. F. L. Dormant. Within the next few weeks all of them will probably be ready for submission to the Council. Total cost of the four bridges will be in the neighborhood of \$150,000.

Minneapolis, Minn.—The Co. Comrs. of Wood Co. have passed an order authorizing the issue of \$120,000 road and bridge bonds.

Orange, Tex.—Sec'y E. W. Anderson of the Orange Commercial Club has formulated plans for the construction of a modern draw bridge across the Sabine River from the east end of Green Ave. to the west end of the Transcalcasien Rd. It is proposed that the main bridge will be 250 ft. long with approaches.

Milwaukee, Wis.—The Highways and Bridges and Laws and Legislation Committees of the Milwaukee Co. Bd. has decided to ask the board to appropriate \$190,000. Forty thousand dollars of this amount will be expended for road machinery.

Bids Received and Contracts Awarded.

Riverside, Cal.—The contract for the construction of a 4-span highway bridge across the Riverside-Rialto has been awarded to Robert H. Swinney of San Bernardino at \$4,203.

Deerfield, Fla.—The contract for the construction of a one-span bridge, 124 ft. long over the Hillsboro River at this place has been awarded to the Champion Bridge Co. of Wilmington, O., at \$7,700.

Winnebago, Ill.—The contract for the construction of two road bridges south-east of the village of Winnebago has been awarded to M. M. Billmyre of Ashton, at \$1,691.

Columbus, Ind.—The Co. Comrs. of Bartholomew Co. have awarded the contract for the construction of the Chambers Creek Bridge to L. H. Harman at \$367. The contract for the Cooper Hill Bridge was awarded to E. A. Diewart at \$4,801.

Muskogee, Okla.—The Co. Comrs. of Muskogee Co. have awarded the contract for two bridges near Warner and two near Forum to the Vincennes Bridge Co., Vincennes, Ind., at \$6,200.

BONDS.

Jacksonville, Fla.—Bids will be received Oct. 15 for the purchase of \$100,000 street bonds, interest 4½%, 34½ years. Address W. M. Bostwick, Jr.

Atlanta, Ga.—The Council is considering the matter of issuing \$2,000,000 street improvement bonds. Address Mayor.

Bellevue, Ky.—An election will be held in November to decide the question of

issuing \$60,000 for streets and alleys. Address City Atty. Shackie.

Gloster, Miss.—At a recent election held in the Third Supervisor's District of Amite Co. it was decided by the voters to bond the district in the sum of \$80,000. Bonds to be 20-year, bearing 5%, proceeds to be used for the purpose of building roads in the district.

Gulfport, Miss.—Bids will be received Oct. 7 for the purchase of \$15,000 6½% 25-year road district No. 3 bonds. Address F. S. Hewes.

Winona, Miss.—At a special election held Sept. 2 \$40,000 in bonds was voted for the construction of good roads.

Beatrice, Neb.—A special election will be held soon to decide the question of issuing \$11,000 paving bonds. Address Mayor Amyer.

Caldwell, O.—Bids will be received Oct. 1 for the purchase of \$10,000 5% road bonds. Address C. R. Gibson, Noble Co. Aud.

Canal Dover, O.—Bids will be received Sept. 30 for the purchase of \$12,000 4½% paving bonds. Address C. A. Hanner, Aud.

Columbus, O.—Bids will be received Sept. 16 for the purchase of \$297,000 grade crossing bonds, payable Oct. 1, 1947.

Lorain, O.—Bids will be received Sept. 23 for the purchase of \$16,500 4½% paving bonds. Address E. P. Keating, Aud.

Nottingham, O.—Bids will be received Sept. 23 for the sale of \$19,594 4½% curbing and paving bonds. Address J. C. Steinickie, Clerk.

Onk Harbor, O.—Ten thousand dollars worth of 5% street improvement bonds have been sold to Sidney Spitzer & Co. of Toledo at \$10,211.

Uhrichville, O.—Bids will be received Oct. 1 for the purchase of \$10,300 5% paving bonds. Address Henry O. Snyder, Vil. Clerk.

Cameron, Tex.—The Cmrs.' Court of Milam Co. has ordered an election for the 17th of September in Justice's Precinct Nos. 5 and 8 comprising Cmrs.' Precinct No. 4 for the purpose of voting on a proposed bond issue of \$200,000 in said territory for road purposes.

Richmond, Tex.—An election will be held Sept. 24 to decide the question of issuing \$175,000 road bonds. Address City Clerk.

Fairmont, W. Va.—An election will be held in September to decide the question of issuing \$400,000 for paving purposes. Address City Clerk.

Seattle, Wash.—The Co. Comrs. of King Co. have adopted a resolution agreeing to submit the question of a \$3,000,000 bond issue for trunk highway construction to a vote of the people of the county at the coming fall election.

Benwood, W. Va.—The Marshall Co. Court has entered an order authorizing a bond election in Union Dist. for \$150,000 to build hard surface roads.

MISCELLANEOUS.

Brownsville, Tex.—Bids will be received Sept. 2 for the construction of drainage ditches of the estimated length of 29 miles, and other improvements, including bridges, culverts, etc. Address J. W. Davis, engr.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

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Report on Street Paving in Philadelphia

According to a report submitted by Chief Connell of the Bureau of Highways and Street Cleaning, to the Director of the Department of Public Works, Philadelphia, Pa., figures previously compiled show the mileage of improved pavement in the city to be considerably less than it really is.

Mr. Connell's figures show the total miles of city streets paved with improved pavements to be 1,205.76. Streets and country roads paved with macadam number 290.63 miles, making the improved streets and roads in Philadelphia 1,496.39. The previous figures show a total of 1,114.86 miles of streets with improved pavements or 90.9 miles less than those resulting from a recent investigation made by Mr. Connell.

A statement of the number of miles of paving, the average width and approximate number of square yards of each class of paving follows: Granite block, 472.76 miles, average width, 28 ft., approximate number of square yards 7,720,000; asphalt, 484.44 miles, 27 ft., 7,640,000 sq. yds.; vitrified brick, 193.07 miles, 27 ft., 3,030,000 sq. yds.; asphalt block, 7.55 miles, 16 ft., 70,800 sq. yds.; slag block, 12.25 miles, 13 ft., 85,000 sq. yds.; cobble, 14.18 miles, 18 ft., 150,000 sq. yds.; rubble, 671 miles, 16 ft., 63,100 sq. yds.; wood block, 401 miles, 56 ft., 132,200 sq. yds.; cement, 9.33 miles, 12 ft., 65,600 sq. yds.; granolithic, 1.46 miles, 14 ft., 12,100 sq. yds.

Chief Connell's report also states that volume I of "Philadelphia" issued in July, 1909, which was the official publication of the city government, stated that Philadelphia had over 1,800 miles of graded and paved streets, which figure is approximately 200 miles in excess of the number at that time, and approximately 150 miles in excess of the mileage of graded and paved streets at the present time.

The investigation also discloses the fact that there are 179.6 miles of earth roads and streets, making a total of 1,675.99 miles of streets and roads paved and unpaved open to travel throughout the city.

A list of the existing contracts in the Bureau of Highways is given showing the number of contracts, kind of paving, and amount involved, as follows: Asphalt, 182 contracts, \$1,208,368; grading, 38 contracts, \$311,441; wood block, 16 contracts, \$275,522; bituminous, 20 contracts, \$245,658; stoning, 36 contracts, \$138,091; granite, 20 contracts, \$180,049; brick, 24 contracts, \$90,199. Total, 336 contracts, amounting to \$2,449,328. Contracts which will be under way by the end of this month will bring the total amount to approximately \$4,000,000.

In his report Chief Connell calls the attention of the Director of Public Works to the fact that the schedule transmitted with the report for repaving Broad street, between Cumberland and Silver streets, with redressed granite block, provides for a type of pavement which is an innovation in Philadelphia, it being originally used in the Borough of the Bronx, New York City, where a number of miles of pavement of this type has been laid with success. The pavement consists of old granite blocks cut in half and redressed. The joints are grouted and the result is

said to be a smooth granite block pavement equal to a new dressed granite block pavement which would cost about \$1 more per sq. yd.

Proposals for additional work, mentioned in the report, which will be received during the current month provide for grading 45 streets, paving 7 and resurfacing 5 macadam roads. The work is estimated to cost over \$1,000,000. Included in it is the service test road on Bensalem Pike, mention of which has been made in a previous issue of "Good Roads." This work will consist of 26 different sections of roadway which will be constructed with various materials. It is the intention of the Department of Public Works to have sections of the different kinds of surface cut from the streets and placed on tables along the roadside with sign boards bearing explanations and descriptions of the sections on display.

It is stated that the request has been made of Commissioner Bigelow, of the State Highway Department, in connection with this test road building, that the state cooperate by building an additional three miles of the road with improved pavement.

To Mark Automobile Roads in Colors

C. Gordon Reel, State Superintendent of Highways of New York, has officially designated several main highway routes of the state by colors for the guidance of automobilists. This has been done in accordance with the suggestion of Frank D. Lyon, Secretary of the New York State Automobile Association, as announced in a recent issue of "Good Roads."

Five routes have been designated with colors, red, blue, yellow, green and brown respectively, and state highway employees have been appointed to begin marking the routes at once. Telegraph poles along the lines will be painted in colors by local automobile clubs and the state will paint the top rails of fences and bridge approaches. Colored disks will designate routes through cities and towns and maps will be prepared showing the color scheme and outlines. Connecting routes will later be designated by combinations of colors. The routes designated are as follows:

Blue—New York to Buffalo, via Poughkeepsie, Albany, Schenectady, Utica, Syracuse, thence by two branches, one going through Rochester, the other through Auburn and Geneva to Leroy, thence to Buffalo.

Red—New York to Jamestown. This will be known as the "Overland Trail" as laid out by the American Automobile Association to the west along the southern tier. It will go through Nyack, Goshen, Middletown, Binghamton, Elmira, Hornell, Olean, Salamanca and Jamestown and thence west.

Yellow—New York to the Canadian border and return, skirting the Adirondack mountains. This route goes northward through Mount Vernon, White Plains, Dover Plains, Chatham, Valatie, Troy, Eagle Bridge, Salem, Middle Granville, Ticonderoga, Westport, Elizabethtown, Lake Placid, Saranac Lake, Paul Smith's to Malone, thence to Ogdensburg, Alexandria Bay, Watertown, Copenhagen,

Boonville, Utica, Mohawk, Cooperstown, Colliers, Stamford, Arkville, Kingston, Newburg, Nyack and New York.

Green—From Binghamton via Albany and Rouses Point to Niagara Falls through Oneonta, Albany, Saratoga Springs, Lake George, Chestertown, Schroon Lake, Elizabethtown, Keeseville, Plattsburg, Rouses Point, Malone, Potsdam, Canton, Antwerp, Watertown, Pulaski, Oswego, Rochester, Lockport and Niagara Falls.

Brown—Oswego to Binghamton via Syracuse and Cortland.

Maryland Commission to Ask for Additional Funds

The State Roads Commission of Maryland has passed a resolution requesting the Board of Public Works to sell \$1,000,000 worth of bonds authorized at the last session of the Legislature and to place the money to the credit of the commission. Gov. Goldsborough has announced that he will call a meeting of the Board of Public Works during the latter part of September so as to advertise the bonds for sale in time for them to be issued Dec. 1.

This will be the second issue of \$1,000,000 of the \$3,170,000 called for under the law, the first \$1,000,000 having been issued Aug. 1 of this year. This will leave \$1,170,000 still to be issued, and in addition to this there still remains, under the road and bridge loan of 1910, \$250,000 issuable Jan. 1, 1913; \$500,000 of the \$5,000,000 loan of 1908 issuable at the same time, and \$250,000 of the road and bridge loan, issuable Jan. 1, 1914, making a total of \$2,170,000 still available after the proposed \$1,000,000 issue.

It is the intention of the commission to push road work in the state as long as weather conditions will permit.

A contract was recently awarded by the commission for the construction of five miles of concrete road from Rock Point in the lower part of Charles County north to Tompkinsville. This concrete road will be the first of that type in lower southern Maryland, and the longest stretch of concrete road in the state. It will be 10 ft. wide, with a $\frac{1}{2}$ -in. luminous surface.

Chief Engineer Shirley is said to favor the construction of roads of this type, particularly in low, wet sections.

Proposed Municipal Plant in Minneapolis

The Committee on Paving of the City Council of Minneapolis, Minn., has voted to recommend the establishment of a municipal creosoting plant for treating wood paving blocks. The project has been discussed in a general way for some time, and it is the opinion of the city engineer that a plant of sufficient capacity to keep several paving crews steadily employed can be built for \$45,000. This amount will be included in the budget for permanent improvements in 1913.

The action of the committee was prompted by the great difficulty encountered in obtaining blocks this year, whereby the paving work was considerably delayed.

Road Building in Colombia

Increased interest in automobiling in Colombia has resulted in a demand for more and better roads and streets.

An automobile road from Barranquilla to connect with Puerto Colombia is now being projected and it is thought that the work of construction will be commenced within a short time. A road between Barranquilla and the old city of Cartagena is also planned. A practicable route was recently selected.

Street Work in Brazil

According to a statement in a recent number of the Daily Consular and Trade Reports, issued by the British Council at Sao Paulo, Brazil, a law has recently been passed by the state of Sao Paulo bearing upon the repair and upkeep of existing roads.

In order to facilitate communication between the various cities and towns of the interior, concessions will be granted securing to the holders the sole right of carrying goods and passengers in motor cars over state roads for 30 years, upon condition that they shall rebuild these roads six meters (19 2-3 ft.) wide and maintain them in a condition suitable for motor and vehicular traffic. After the termination of the 30-year period all rights in connection with the roads shall revert to the state.

Two concessions have already been granted, one for the road between Santos and Sao Paulo and one between the city of Piracicaba and Limeira. For the Santos-Sao Paulo road, the holders of the concessions are bound to construct two macadamized highways, each of a minimum width of four meters (13 $\frac{1}{2}$ ft.) to be completed in two years. One of the ways is to be reserved exclusively for the motor vehicles of the holders and the other for public use.

The municipality of Sao Paulo has commenced operations on a system of public improvements, which involves an estimated expenditure of \$20,000,000, toward which amount the state has already contributed \$3,500,000. The improvements consist of replacing the existing viaduct which spans the valley between the old city and the modern extensions, with a more solid structure. Three additional viaducts will be built, the principal thoroughfares will be asphalted, several existing streets will be widened, and a number of main boulevards constructed, so as to traverse the city in all directions. In addition to this work the valley to be spanned by the viaducts will be drained, leveled and converted into a public garden. The plans for the improvement were drawn up by M. Bonvard, architect for the city of Paris.

Ohio Bond Issue Probably Defeated

From subsequent evidence it now appears that the first reports concerning the ratification of amendment 29 to the Ohio constitution, which provided for extending the debt limit to \$50,000,000 for the purpose of issuing bonds in that amount, the proceeds of which were to be used for the building of good roads, were incorrect.

Returns, which came in the day after the election, indicated that the bond issue had carried by a fair majority, as reported in "Good Roads" for September 7. Later returns, however, from the remote agricultural districts were almost altogether unfavorable, and it is reported that the indications are now that the rural vote of the state has defeated the issue by at least 12,000 votes.

Propose Coast to Coast Road

At a banquet held Sept. 10, at Indianapolis, Ind., by about 300 automobile manufacturers and dealers of that city, a project to build a macadam roadway to extend from New York City to San Francisco, a distance of 3,340 miles costing \$25,000,000, was launched.

The sum of \$300,000 to start the campaign in Indiana was pledged at the banquet. The plan is to furnish material to cost about \$12,000,000 free to the counties through which the road will pass, the counties being asked only to pay the cost of construction. A commission will be chosen by an organization of automobile manufacturers to select the route, and it is the purpose of the promoters to have the road constructed under the supervision of federal government engineers.

GOOD ROADS

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CORRESPONDENCE

The Atlantic City Convention

Editor, "Good Roads":

The September number of "Good Roads" contains a letter from Mr. Harold Parker, Vice President of the Hassam Paving Company, and an editorial concerning the American Road Congress which meets at Atlantic City, Sept. 30 to Oct. 5, based upon a misapprehension or a misconception as to the facts in the case.

The statement in Mr. Parker's letter, that the American Automobile Association and the National Association of Road Machinery and Material Manufacturers are organizations affiliated with the American Association for Highway Improvement, is entirely incorrect, as these two organizations are absolutely independent, and are participating in the American Road Congress on terms of equality with the American Association for Highway Improvement. It is true, however, that between thirty and forty state and inter-state organizations are identified with the Congress in an associate capacity.

Mr. Parker's letter would lead one to believe I gave him the impression that the American Association for Highway Improvement would confine itself strictly to propaganda for road improvement. At the congress held by the American Association for Highway Improvement, in Richmond, Virginia, in November, 1911, a distinct section was devoted to the problems on road construction and maintenance, and over this section Mr. Harold Parker himself presided.

At the Richmond Congress I, personally, urged upon the representatives of the American Automobile Association, the National Association of Road Machinery and Material Manufacturers, and the American Road Builders' Association present, that all of the organizations, including the American Association for Highway Improvement, join in the holding of a great national road congress in 1912. The representatives of these four organizations reported favorably to their respective boards of directors, and a duly authorized joint committee prepared a program on which two days of the American Road Congress were set aside for the discussion of questions of construction and maintenance. This program will be carried out as originally planned.

Mr. Parker's contention, supported by the Editor of "Good Roads," that the field of construction and maintenance is the exclusive property of the American Road Builders' Association, does not represent the views of a large proportion of the membership of that organization, many of whom are also members of the American Association for Highway Improvement, and are participating in the program at Atlantic City.

That Mr. Parker and the Editor of "Good Roads" stand almost alone in their criticism of the construction and maintenance feature of the American Road Congress, is indicated by the fact that among the ones representing that section are twenty-four state highway commissioners, state highway engineers, or officials occupying similar positions, and on the program of that section appear the foremost authorities on road, street and bridge work in the United States. Eight of those who will take part in the program are directors of the

American Road Builders' Association. It seems an undue assumption of authority on the part of Mr. Parker and the Editor of "Good Roads" to criticize a policy and a program so largely indorsed by their own associates. Never before have such elaborate preparations been made for a road congress in the United States, and it will undoubtedly be the largest and most successful ever held in this country.

L. W. PAGE, President, American Road Congress.

We gladly print the above letter from Mr. Page for two reasons—first, because the correspondence columns of "Good Roads" are always open to the presentation of both sides of all questions, and, second, because it gives us an opportunity—even obligates us—to make perfectly clear our position in regard to the matter in question, both by reiterating the statements made in the editorial referred to and by pointing out the manner in which Mr. Page has misconstrued our meaning.

Mr. Page states in the second paragraph of his letter that Mr. Parker's contention "that the American Automobile Association and the National Association of Road Machinery and Material Manufacturers are organizations affiliated with the American Association for Highway Improvement is entirely incorrect as these two organizations are absolutely independent and are participating in the American Road Congress on terms of equality with the American Association for Highway Improvement." Mr. Page should know, if anyone does, upon just what terms of "equality" the other two associations stand. Ostensibly, the American Road Congress, so-called, is held jointly by the three associations named, yet it is a fact that the active president of the American Road Congress is the president of the American Association for Highway Improvement, the treasurer of the American Road Congress is the treasurer of the American Association for Highway Improvement and the secretary of the American Road Congress is the secretary of the American Association for Highway Improvement. It also seems sufficiently evident that the American Road Congress is the outgrowth of efforts by the American Association for Highway Improvement, and that that association is the active leader and the directing spirit in the preparations for the Atlantic City meeting.

"Mr. Parker's letter," Mr. Page says, "would lead one to believe I gave him the impression that the American Association for Highway Improvement would confine itself strictly to propaganda for road improvement." Mr. Page might well have put this more strongly. Mr. Parker's letter could hardly give any other impression than this, since he stated plainly that Mr. Page had many times assured him that his association "took part in the promulgation of the propaganda for good roads alone, and that its activities would be confined entirely to the effort, 'to stimulate sentiment for wise legislation and correlate and harmonize existing organizations.'" The facts which Mr. Page recites relative to the holding of a section devoted to construction and maintenance at the Richmond meeting, over which Mr. Parker presided, and to the efforts made by Mr. Page to induce the American Automobile Association, the National Association of Road Machinery and Material Manufacturers and the American Road Builders' Association to join with his association in the holding of a convention in 1912 do not seem to bear particularly upon this question. Either Mr. Page did assure Mr. Parker that the American Association for Highway Improvement would confine itself to propaganda, or else he did not so assure Mr. Parker. Since Mr. Parker has seen fit to assert that he received such assurance, "Good Roads" sees no reasons to doubt it.

No comment is necessary on the efforts made to induce the American Road Builders' Association to join with the others in the holding of a joint convention nor upon the events leading up to the decision of the American Road Builders' Association not to affiliate. This matter was covered fully in "Good Roads" for May 18 of this year.

Mr. Page's idea that Mr. Parker and the editor of "Good Roads" contend that the field of construction and maintenance is the exclusive property of the American Road Builders' Association is an entirely mistaken one, in so far, at least, as "Good Roads" is concerned. The editors of this journal have never made any such contention, nor do they hold any such opinion. It was stated editorially, however, that the American Road Builders' Association was better fitted to deal with these matters than any other organization and that these questions could better be taken up at a convention devoted solely to them than at a convention at which both the popular and technical side of the good roads movement were considered. "Good Roads" is still of this opinion.

The truth of this contention was proven by the two conventions held last year, one at Rochester, by the American Road Builders' Association, and the other at Richmond, by the American Association for Highway Improvement. At the Rochester convention, the proceedings were limited to the technical discussion of questions of organization, construction and maintenance. Only a limited number of formal papers was presented, the subjects and the authors being selected with a view to covering thoroughly these questions. The men who delivered the papers were well known authorities in their respective lines, and their presentation of the subjects was followed by formal discussions by especially selected speakers and by general discussions in which all of those present were allowed to participate. The attendance at this convention was between 1,400 and 1,500, and practically all of those present were engaged either directly or indirectly in the construction and maintenance of roads. The Richmond convention took up four days, the first being designated as "National Day," the second as "Highway Engineers' and Contractors' Day," the third as "Road Users' Day" and the fourth as "Association Day." Thus at only one session was attention given to the practical questions of road building, and though several excellent papers were pre-

sented the subject was considered neither in as orderly a manner nor as fully as at the other convention. The remaining three days were given over to various propaganda features, of which agitation for national aid formed no small part. The attendance at this convention was approximately half that at Rochester, and of the some 700 who were present it is safe to assume that not more than 50 per cent. were men actually engaged in the building and maintaining of roads.

In the closing paragraph of Mr. Page's letter he says that it seems an "undue assumption of authority" on the part of Mr. Parker and the editor of "Good Roads" to "criticise a policy and a program so largely endorsed by their own associates." The assumption of authority by Mr. Parker does not concern the editors of "Good Roads." Mr. Parker is a man of recognized ability and unquestioned integrity. To him, as to anyone else with anything of value to say, the correspondence columns of "Good Roads" are always open, though the publication of a letter in that department of the journal does not by any means carry with it the assumption of responsibility by the publication for what the letter contains. In this case, however, the views expressed by Mr. Parker coincided with those of "Good Roads," and an editorial was printed indorsing those views and, to some extent, enlarging upon them. As to its being an undue assumption of authority on the part of the editor to make these criticisms, but little comment is necessary. Perhaps the members of the American Road Builders' Association may correctly be called the associates of the editors, since all of the members of the editorial staff of this journal are also members of that association. For that matter, the editors are also members of other organizations, one of them of the American Association for Highway Improvement. These facts, however, do not preclude "Good Roads" from criticising—adversely if it seems desirable—any action which may be indorsed by some members of the American Road Builders' Association, the American Association for Highway Improvement or any organization of which the editors may be members.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Personal Notes

M. M. O'Shaughnessy has been appointed City Engineer of San Francisco, Cal., to fill the vacancy occasioned by the resignation of Marsden Manson. Mr. O'Shaughnessy is a graduate of the Royal University of Dublin and is a member of the American Society of Civil Engineers. He has been engaged in municipal improvement work in California since 1885.

Benjamin M. Harrod, City Engineer of New Orleans, La., between 1888 and 1892 and 1895 and 1902, died in that city on September 7.

G. W. Pearsoll, City Engineer of Park City, Tenn., has resigned and Frederick Thomas has been appointed his successor.

Geo. F. Scannel, former Highway Commissioner of New York City, died September 18 at his home, 128 E. 31st street, Manhattan. Mr. Scannel succeeded James C. Collins as highway commissioner when the latter was dismissed from office by Borough President Ahearn in 1903, and held the office until 1909. Mr. Scannel's death was attributed to a complication of diseases and he had been ill for some time.

Trade Notes

The Blystone Machinery Co., of Cambridge Springs, Pa., has issued a post card folder describing the Blystone batch mixer. Illustrations of the two styles of the mixer are shown, one mounted on a truck with a power plant, and the other mounted on a hand truck without power.

The "Automobile Journal" for July 25, 1912, contained a 6-page article on the tar macadam highways of Rhode Island. A detailed description of the method of construction of Tarvia macadam roads is given.

Literature is being distributed by the Western Portland Cement Manufacturers' Association offering free information regarding the building of cement roadways and pavements with Portland cement foundations.

The Atlanta Gas Light Co. of Atlanta, Ga., is distributing an illustrated booklet descriptive of Agasco tar products. Agasco Dust Not, a dust layer, and Agasco Road Binder are both manufactured by the Atlanta Gas Light Co., and are described in the booklet.

The Troy Wagon Works Co. has issued a 6-page folder entitled "Simplicity Means Service." It is descriptive of the Troy dump wagons, and is illustrated with line cuts showing the various parts of the wagons and calling attention to their advantages. The dumping device is particularly featured. The folder is printed in two colors.

CONTRACT NEWS

CONTRACTS PENDING

ROADS AND STREETS.

9-23	Clanton, Ala., grading and gravel rd.	9-21
9-23	Sacramento, Cal., state rd. wk.	9-21
9-23	Elgin, Ill., grad. and brk pav.	9-21
9-23	Keokuk, Ia., concrete pav.	9-21
9-23	Guadalupe, O., storm drains	9-14
9-24	Decatur, Ala., road work	9-14
9-24	Toledo, O., grad., drain, mac.	9-7
9-24	Austin, Tex., paving	9-14
9-24	Hartford, Conn., state rd. work	9-21
9-24	Baltimore, Md., state rd. work	9-21
9-24	Mineral Point, Wis., cement sidewalks	9-21
9-26	Ft. Myers, Fla., shell rd.	9-21
9-26	Myntington, W. Va., st. pav'g.	9-21
9-27	New York, N. Y., street work	9-21
9-28	Liberty, O., grading	9-21
9-30	Terre Haute, Ind., asphalt pav'g.	9-21
10-1	Montgomery, Ala., grad. drain, mac.	9-21
10-1	Cullman, Ala., road work	9-14
10-3	Columbus, O., grad. pav.	9-21
10-8	Corydon, Ind., road constn.	9-21
10-9	Cleveland, O., road imp.	9-21
10-11	Columbus, O., bit. and bk pav.	9-21

BRIDGES.

9-23	Coshocton, O., bridge constn.	9-21
9-23	Lawrenceville, Va., bridge	9-7
9-23	Wichita, Kan., reinf. con. bridge	8-31
9-24	Chicago, Ill., bascule bridge	9-7
9-24	Merrill, Wis., trestle and pile bridge	9-21
9-25	Livingston, Ala., steel and con. bridge	9-21
9-27	Cincinnati, O., bridges and culverts	9-14
9-28	Cleveland, O., concrete arch	9-14
9-28	Cleveland, O., con. bridge balustrade	9-21
9-28	Tuscaloosa, Ala., 4 con. steel bridges	9-21
10-5	Cleveland, O., bridge work	9-21
10-6	Wagoner, Okla., 4 bridges	9-7
10-7	Santa Barbara, Cal., 2 bridges	9-21
10-7	Salem, Ind., bridge	9-21
10-7	Leavenworth, Kan., bridges	9-21
10-8	Elkins, W. Va., bridge constn.	9-21
10-18	Santa Fe, N. M., bridge constn.	9-21
11-11	Huntsville, Tex., 2 steel bridges	9-21

MISCELLANEOUS.

9-20	Washington, Pa., vit. pav. blks.	9-21
9-23	Amsterdam, O., bonds	9-7
9-23	Lorain, O., bonds	9-14
9-23	Nottingham, O., bonds	9-14
9-30	Canal Dover, O., bonds	9-14
10-1	Ulmerville, O., bonds	9-14
10-1	Caldwell, O., bonds	9-14
10-2	Cleveland, O., bonds	9-21
10-7	Gulfport, Miss., bonds	9-14
10-15	Jacksonville, Fla., bonds	9-14

ROADS AND STREETS.

Bids Asked and Prospective Work.

Clanton, Ala.—Bids will be received by the Court of Comrs. at the Court House at Clanton until noon Sept. 23, 1912, for grading, draining and surfacing with gravel approximately six miles of State aid road. Certified check for \$400 required with each bid. Address W. S. Keller, State Highway Engineer.

Montgomery, Ala.—Bids will be received by the Court of Comrs. of Cullman Co. at the Court House, Cullman, until 11 a. m. Oct. 1, 1912, for grading, draining and macadamizing two roads near Cullman at an estimated expenditure of \$8,000. Certified check for \$400 required with each bid. W. S. Keller is State Highway Eng.

Healdsburg, Cal.—The Trustees are planning for the permanent improvement of the streets surrounding the Plaza.

Hollister, Cal.—The city is contemplating the improvement of four streets with Bitulithic pavement.

Merced, Cal.—The City Trustees have started proceedings for the improvement of 39 blocks in the residence section of the city. The Trustees have decided upon asphalt pavement on cement base.

Riverside, Cal.—The Bd. of Spvs. has ordered the expenditure of \$75,000 on road improvements. Of this amount \$55,000 will be spent on constructing a rock macadam highway between Beaumont, Banning and Coachella.

Sacramento, Cal.—Bids will be received up to Sept. 23 at the office of the California State Highway Comm., Forum Bld., for constructing a portion of the State Highway in Merced Co., between Arena and Merced, Div. 6, Route 4, Sec. E, about 10.9 miles in length, to be built of Portland cement concrete and bituminized sur-

face; also for constructing a portion of the State highway in Placer Co., between the south boundary and Lincoln, Div. 3, Route 3, Sec. A, about 10 miles in length, to be built of Portland cement concrete and bituminized surface; also for constructing a portion of the State highway in Sacramento Co., between Auburn Co. road and the Placer Co. line, Div. 3, Route 3, Sec. A, about 1.9 miles in length, to be built of Portland cement concrete and bituminized surface.

The plans and specifications of Co. Surv. Miller for the construction of a new road in Folsom leading north from that town have been adopted by the Spvs., and bids have been called for, to be opened Sept. 26.

San Francisco, Cal.—The Bd. of Pub. Works has granted permission to property owners to make street improvements at the following locations by private contract: Curbing, paving, etc., southerly half of crossing of Ninth and Brannan Sts.; curbing and paving, etc., Ninth St., from Brannan St.; grading, curbing and paving 44th Ave., between Balboa and Cabridello Sts.; also 11th Ave. between same Sts.; also Girard St., between Mansell and Olmstead Sts.; also Balboa St., between 19th and 20th Aves.; grading San Bruno Ave., between Dwight St. and Railroad Ave.; grading, curbing and paving crossing of 10th Ave. and Noriega St.

Hartford, Conn.—Sealed proposals will be received until 2 p. m. Sept. 24, 1912, by the State Highway Commissioner at room 27, State Capitol, for the following State road work: Town of Lisbon, about 26,660 lin. ft. gravel or native stone macadam. Plans and specifications at the house of James H. Kennedy, 1st Selectman (near Greenville), Lisbon. Town of Griswold, about 15,000 lin. ft. macadam-gravel road. Plans and specifications at Town Clerk's office, Jewett City. Towns of Stafford, Ellington, Tolland and Willington, about 23,000 lin. ft. graded road with six-inch hardening course and one inch trap rock surfacing. Plans and specifications at the office of Anthony Adams, Stafford Springs. Town of Litchfield, about 12,775 lin. ft. graded or gravel road. Plans and specifications at Town Clerk's office, Litchfield. Town of Thomaston, about 7,766 lin. ft. gravel. Plans and specifications at Town Clerk's office, Thomaston. Town of Branford, about 4,064 lin. ft. special macadam road. Plans and specifications at Town Clerk's office, Branford. Town of Woodbridge, about 9,440 lin. ft. graded or gravel road. Plans and specifications at the house of Silas J. Peck, 1st Sel., Woodbridge. Town of Thompson, about 16,800 lin. ft. native stone macadam road. Plans and specifications at the house of Philip Wolsard, 1st Sel., North Grosvendale. No plans or specifications can be sent to any contractor, but they may be examined at the places named above or at the office of Jas. H. McDonald, State Highway Comr. at Hartford.

Ft. Myers, Fla.—Sealed proposals will be received by H. E. Heitman, Fort Myers, until Sept. 26, 1912, for the clearing, grading and construction of 10 miles of shell automobile road between Fort Myers and Punta Rassa, Fla.

Blakely, Ga.—One hundred thousand dollars will be expended for the construction of good roads. Address O. H. Sheffield, Chmn., Cedar Springs, Ga.

Bowden, Ga.—Four thousand dollars will be expended for paving streets throughout the city. Address Mayor.

Calro, Ill.—Ordinances have passed the Council for paving and curbing several streets. Robt. A. Hatcher is City Clerk.

Elgin, Ill.—Sealed proposals will be received by the Bd. of Loc. Imp. of the city of Elgin until 10 a. m. Sept. 23, 1912, at the office of the Bd., rooms 2, 3 and 4, City Hall Building, for grading and paving with brick on a 2-in. sand cushion on a 5-in. concrete foundation, constructing a concrete combined curb and gutter and otherwise improving the roadway of St. Charles St., between the south line of Bluff City Bvd. and the south line of Villa St. Morgan H. Brightman is Sec'y of the Bd.

Mattoon, Ill.—The City Council has passed an ordinance authorizing the Bd. of Local Imps. to pave portions of Tenth St., De Witt Ave., Sixth St. and Champaign Ave.

Corydon, Ind.—Sealed bids will be received by the Bd. of Comrs. of Harrison Co. until 1:30 p. m. Oct. 8 for the construc-

tion of a free gravel or macadam road in the Blue River Twp. Wm. Taylor is Co. Aid.

Sealed bids will be received by the Bd. of Comrs. of Harrison Co. until 1:30 p. m. Oct. 8 for the construction of a free gravel or macadam road in Franklin Twp.

Sealed bids will be received by the Bd. of Comrs. of Harrison Co. until 1:30 p. m. Oct. 8 for the construction of a free gravel or macadam road in Morgan Twp.

Sealed bids will be received by the Bd. of Comrs. of Harrison Co. until 1:30 p. m. Oct. 8 for the construction of two free gravel or macadam roads in Harrison Twp.

Terre Haute, Ind.—Bids will be received Sept. 30 for the improvement of Seventh St. by paving with asphalt, street curbing, etc. Address P. B. Walsh, pres. Bd. of Loc. Imps.

Cedar Rapids, Ia.—The Council is planning to pave Seventeenth St. Address City Eng.

Keokuk, Ia.—Bids will be received Sept. 23 for the construction of guttering and paving with concrete of Seymour St. Address O. W. Sandberg, City Clerk.

Baltimore Md.—Bids will be received Sept. 24 for building a section of State highway in Garrett Co. and for paving Hanover St. Address W. L. Maroy, Sec'y of State Comm. of Roads, Baltimore.

Laurel, Miss.—The county is planning to expend \$200,000 in road improvements. Address C. R. Govins at Laurel.

Galesburg, Mo.—The City Council is planning to pave Fifth St. Address City Clerk.

New York, N. Y.—Sealed bids will be received by George McAneny, Pres. Boro. of Manhattan, at his office in City Hall, until 2 p. m. Sept. 27, 1912, for the following street work: Repairing sheet asphalt pavements in the Boro. of Manhattan, together with the work incidental thereto, in Section No. 2, bounded by Tenth St., North River, Forty-second St. and East River, and widening and repaving with wood blocks pavement on a concrete foundation the roadway of Second Ave. from north side of Fifth St. to north side of Seventh St.

Sealed bids will be received by the Pres. of the Boro. of Brooklyn at his office in Boro. Hall until 11 a. m. Sept. 25, 1912, for regulating and repaving with granite, grade 2, on a concrete foundation, the roadway of Myrtle Ave., from Hudson Ave. to Vanderbilt Ave., in the Boro. of Brooklyn (contract of John L. Durkin, declared by the Pres. of the Boro. of Brooklyn to have been unnecessarily delayed, as per section "Q" of the contract), together with all work incidental thereto; for regulating and repaving with asphalt pavement on concrete foundation the roadway of East Sixteenth St., from Dorchester road to Ditmas Ave., and for furnishing and delivering 200 tons of paving pitch.

Akron, O.—The Council is planning to pave several streets with Medina stone and brick. Address City Clerk.

Cleveland, O.—Sealed proposals will be received at the office Bd. of Comrs. of Cuyahoga Co. until 11 a. m. Oct. 9 for the improvement of Warren Road, from Detroit Road to Fisher Road, in Rockford Twp., in accordance with the form of the contract and specifications to be furnished by Frank Lander, Co. Surv.

Sealed proposals will be received at the office of the Bd. of Comrs. of Cuyahoga Co. until 11 a. m. Oct. 9 for the improvement of Warren Munn and Triskitt Road, from Fisher Road to its intersection with Lorain Road, in West Park Twp.

Columbus, O.—Bids will be received Oct. 3 for constructing additional grading and paving on the Cleveland Ave. Address John Scott, Clerk of the Bd. of Spvs.

Ordinances have been passed providing for an issue of bonds in anticipation of the collection of special assessments for the improvement of the following streets: Worthington St., from Tenth Ave. to Eleventh Ave., by grading, draining and curbing the roadway with brick; Cedar Alley, from High St. to Hamlet St., by grading, draining and paving the roadway with brick; Hayes Ave., from Mt. Vernon Ave. to Atcheson St., by grading, draining, curbing paving the roadway with brick and laying water service pipe; Grant Ave., from Broad St. to Town St., by grading, draining, curbing, repaving the roadway with asphalt with brick gutters and laying water service pipe; Born St., from Beck St. to Sycamore St., by grading, draining, curbing, paving the roadway with asphalt with brick gutters and lay-

ing water service pipe; Linwood Ave., from Livingston Ave. to Schiller St., by grading, draining, curbing and repaving the roadway with asphalt; Milton Alley, from Spring St. to Naghten St., by grading, draining and paving the roadway with brick; the alley west of Woodland Ave., from Clinton Ave. to Richmond Ave., by grading, draining, paving the roadway full width with brick; Michigan Ave., from Eighth Ave. to Tenth Ave., by grading, draining, curbing and paving the roadway with asphalt and brick gutters; the alley east of Ninth St., from Beck St. to Sycamore St., by grading, draining, curbing, paving the roadway with brick and laying water service pipe; Hunter Ave., from First Ave. to Third Ave., by grading, draining, curbing, paving the roadway with asphalt and brick gutters; Highland St., from First Ave. to Second Ave., by grading, draining, curbing and paving the roadway with asphalt and brick gutters.

An ordinance has been passed providing for the levying of a special assessment upon the lots and land benefited by the improvement of Elm St., from Third St. to Fifth St., and Rich St., between Rose Ave. and Abbott St.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m. Oct. 11, 1912, for grading and paving with a bituminous surface treated concrete and brick pavement for medium traffic, the Ashland & New London Road, State Highway "F," Pet No. 339, in Ruggles Twp., Ashland Co. Length, 13.365 ft., or 2.51 miles. Width, 14 ft. Estimated cost of construction, \$25,515.28. Date set for completion, Aug. 1, 1913. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Dept.

Liberty, O.—The Trustees of Liberty Twp. will receive bids at the office of the Co. Surveyor until 12 a. m. Sept. 28 for the grading of one mile of road in sections 7 and 18, Liberty Twp. Plans and specifications are on file at the Co. Surveyor's office.

Salt Lake City, Utah.—Bids will be advertised at once for the paving of Fifth East St. Address Comr. R. P. Morris.

Huntington, W. Va.—Bids will be received Sept. 26 for furnishing labor and material for paving several streets throughout the city. Address L. A. Pollock.

Mineral Point, Wis.—Bids will be received Sept. 24 for furnishing material and labor for the construction of 2,000 ft. of cement sidewalks. Address W. H. Bohan, City Clerk.

Bids Received and Contracts Awarded.

Colton, Cal.—A contract for street paving in Colton has been awarded to Bryant & Austin, 1650 Compton Ave., Los Angeles, as follows: 168,453 sq. ft. of asphalt pavement at 16 cents per sq. ft., to total \$26,952.48; 18,813 sq. ft. cement concrete gutters at 15 cents per sq. ft., total \$2,821.95; 948 sq. ft. cement concrete entrances, at 15 cents per sq. ft., total \$142.20; 369 1-2 in. ft. of 30-in. by 8-in. 12-gauge corrugated iron culverts, \$1.75 per lin. ft., total \$646.62; 110 lin. ft. 30-in. by 6-in. 12-gauge corrugated iron culverts, \$1.75 per lin. ft., total \$192.50; 54 lin. ft. of 12-in. diameter 14-gauge corrugated iron culverts, \$1.75 per lin. ft., total \$94.50. Total for all work, \$30,850.25. Charles H. Wondries is City Engr.

Corona, Cal.—The Johnson-Shea Co. of Riverside was awarded the contract at \$12,480.56 for improving Sheridan Ave. from Sixth to Olive Sts. The bid was 30c. for grading, 8.25c. for macadamizing, 9c. for porphyry block gutter, 11c. for sidewalk, 20c. and 30c. for cement curb, concrete culverts, 25c.; corrugated iron culverts, \$1.20 and \$1; catch basins, \$7.50. The Highway Construction Co. of Redlands bid \$13,043.07; Louis Ferrell, of Pomona, \$13,251; W. J. Brand, of Riverside, \$15,261.54. C. Cully is City Engr.

The Johnson-Shea Co. of Riverside was awarded the contract at \$14,450.45 for improving Victoria Ave., from North Blvd. to South Blvd., at 8.95c. per sq. ft. for 161,000 sq. ft. of macadamizing. Louis Ferrell, of Pomona, bid 8.95c. per sq. ft., total \$14,450.45; W. J. Brand, of Riverside, 9.2c., total \$14,845.05; the Highway Const. Co., of Redlands, 9.25c., total \$14,934.80.

Long Beach, Cal.—White & Gaskill have been awarded the contract for the improvement of 15th St. at 8.4c. per sq. ft. for grading and paving, 33.5c. per lin. ft. for cement curbs, 23c. per sq. ft. for cement gutters, 11c. per sq. ft. for cement sidewalks.

Los Angeles, Cal.—The following bids

were received by the Bd. of Pub. Works for improving Macy St., from Main to the Los Angeles River, a distance of 10 blocks: Barber Asphalt Paving Co., (a) 16.2c. for asphalt paving, (b) 26.1c. for brick paving, (c) 43.6c. for granite block paving, (d) 35c. for cement curb, (e) 16.4c. for asphalt sidewalk, (f) 42.4c. for granite block gutter, (g) 11c. for sidewalk, (h) \$3.95 for culverts; Benj. F. Ford, (a) 17c., (b) 32c., (c) 40c., (d) 32c., (e) 17c., (f) 40c., (g) 12c., (h) \$1.80; Fairchild-Gimmore-Wilton Co., (a) 16.8c., (b) 30c., (c) 40c., (d) 30c., (e) 18c., (f) 40c., (g) 12c., (h) \$4.45.

Rogers Bros. were the lowest bidders at \$20,600 for improving Section 6 of the San Fernando Road. The bids received by the Bd. of Spvs. were: Rogers Bros. (a), 1,570 cu. yds. of excavating at 40c.; (b) 20,483 lin. ft. of shaping roadbed at 10c., (c) 12,910 tons of macadam at \$1.25, (d) 7,500 ft. of standard guard fence at 34c.; F. B. Gridley, (a) 50c., (b) 10c., (c) 1.60, (d) 30c.; Galley & Clark, (a) 40c., (b) 10c., (c) 1.69, (d) 49c.; L. G. Garnsey, (a) 20c., (b) 5c., (c) \$1.71, (d) 65c.; F. E. Prendergast, (a) 40c., (b) 10c., (c) \$1.88, (d) 40c. The bids were referred to the Highway Comm.

Merced, Cal.—The Ransome-Crummey Co. was awarded the contract for paving 16th St. for a length of eleven blocks at 13c. per sq. ft. for paving and 35c. per lin. ft. for concrete curbs. Thompson Bros., of Fresno, bid 13 1/2c. for paving and 40c. for curbs. The Worswick St. Paving Co. bid 14c. and 48c.

Pasadena, Cal.—The following bids were opened by the City Council on Sept. 10: For improving San Pasqual St.—J. E. Haddock, grading 90c., curb 26c., gutter 14c., total \$4,395.60; D. C. Howard, grading \$1.20, curb 26 1/2c., gutter 14 1/2c., total \$5,061; James M. Montgomery, grading 97 1/2c., curb 27 1/2c., gutter 14c., total \$4,600.65; W. A. Dontanville, grading 66c., curb 26c., gutter 14c., total \$3,925.20; W. E. Moyle, grading 69c., curb 25c., gutter 13 1/2c., total \$3,887.25; Baldwin Const. Co., grading \$1, curb 26c., gutter 14c., total \$4,591.60. For improving Woodbury Rd.—J. E. Haddock, regrading 25c. per sq. ft., grading 85c. per lin. ft., curb 25c. per lin. ft., gutter 14c. per sq. ft., oiling 70c. per lin. ft., total \$3,968.30; D. C. Howard, regrading 18c., grading \$1.08, curb 25c., gutter 14c., paving per sq. ft. 2 1/2c., total \$4,540.53; W. A. Dontanville, paving 2 1/2c., regrading 22c., grading \$1.29, curb 25c., gutter 14c., total \$4,846.55; W. E. Moyle, regrading 25c., grading 70c., curb 24c., gutter 14c., oiling, 76 1/2c., total \$3,892.55; Baldwin Const. Co., regrading 15c., grading 50c., curb 26c., gutter 14c., oiling 72c., total \$3,616. For improving Washington St.—D. C. Howard, grading 80c., curb 26c., gutter 14 1/2c., sidewalk 9 1/2c., paving 2 1/2c., total \$12,508.65; J. C. Kinsman, sidewalk 8 1/2c., grading 66c., curb 25c., gutter 14c., oiling 56c., total \$11,183.40; Baldwin Const. Co., sidewalk 8 1/2c., grading 48c., curb 26c., gutter 14c., oiling 55c., total \$10,704.60; W. E. Moyle, sidewalk 8 1/2c., grading 60c., curb 25c., gutter 14c., oiling 58 1/2c., total \$11,063.70; W. A. Dontanville, paving 2 1/2c., sidewalk 8 1/2c., grading 72c., curb 25c., gutter 14c., total \$11,696.40.

San Diego, Cal.—C. H. Tingley was awarded the contract for improving Arizona St., from University Ave. to Balboa Park, a distance of 8 city blocks, at 30c. per cu. yd. for excavation, 25c. per cu. yd. for embankment, \$75 for culvert, 11c. per sq. ft. for sidewalk and 37c. per lin. ft. for curb.

The Morse Const. Co. has been awarded the contract for grading the streets in Del Mar Terrace owned by the Interstate Realty & Imp. Co. The contract price is \$20,000.

Santa Barbara, Cal.—The Santa Barbara Paving & Grading Co. was awarded the contract at \$78,940 for paving 9 1/2 miles of the highway in the Permanent Road District of Carpinteria. Rogers Bros. of Los Angeles bid \$81,987.

Rockford, Ill.—A. E. Rutledge & Son were awarded contract for the brick paving of Harlem Ave., at about \$66,000.

Logansport, Ind.—The contract for building eight and one-half miles of stone road at Auburn has been awarded to Beal & Bell of Logansport, at \$26,789.

Lake Charles, La.—The contract for the construction of approximately five miles of cement sidewalks has been awarded by the City Council to the General Paving Co., of Shreveport, at 85 cents per lin. ft.

Owosso, Mich.—Andrew Geeck was awarded the contract for the repaving of West Main St., between the Michigan Central railway tracks at a price slightly over \$17,000.

Beatrice, Neb.—Abel & Roberts of Lin-

coln were to-day awarded the contract for repaving the business part of the city. The contract is \$2.07 per sq. yd., and will amount to about \$40,000.

Dayton, O.—The following bids have been received for grading, graveling, constructing walks and a quarter mile of cinder paths in McKinley Park. R. C. Lyons, \$1,743; H. E. Barney, \$1,895.

The following bids have been received for grading and graveling of Daller St., from the alley east of Kiefer St. to Ray St.: E. M. Kiser, \$1.19 per lin. ft.; J. I. Geiger, \$1.20.

The following bids have been received for grading Glendale Ave., between Lexington and Oxford Aves.: A. J. Kammer, 75 cents per lin. ft. for grading the sidewalks and \$7 for grading the roadway.

The following bids have been received for grading Valley St., between Findlay St. and the corporation line: J. I. Geiger, 74 cents per lin. ft. for sidewalks and \$1 for grading the roadway; W. J. Kernan & Co. bid 90 cents on each.

Port Allegany, Pa.—John Sheehan of Bradford has been awarded a contract for paving two streets at Port Allegany. His bid for the work was \$18,244.13.

Albany, N. Y.—The following awards for the improvement of public highways by state aid have been made by the State Supt. of Highways, bids received Sept. 9 and 10: Highway No. 5365, John Kelly of Syracuse, \$94,869.15; highway No. 5312, Swank & McIntyre, Buffalo, \$85,915.80; highway No. 5339, Albert L. Willy, Binghamton, \$22,862.25; highway No. 1106, N. E. Young, Windsor, \$58,079; highway No. 5217, Mahoney & Swanson, Jamestown, \$70,037; highway No. 5263, Mahoney & Swanson, \$43,640.95; highway No. 5197, Bluff Point Stone Co., Plattsburg, \$14,816.25; highway No. 5228, John D. Sullivan, Keeseville, \$21,293; highway No. 5347, Russo-Parker Constrn. Co., Hudson, \$42,988; highway No. 5343, Bridgeport Construction Co., Poughkeepsie, \$126,491.73; highway No. 5383, H. B. Cooper, Albany, \$18,157.48; highway No. 5384, Gruner & Hollenbeck, Harriman, \$61,933.95; highway No. 5326, part 2, Harvey B. Sproul, Fishkill, \$40,824.50; highway No. 5367, Wm. P. McDonald Constrn. Co., Mt. Vernon, \$72,061.50; highway No. 5369, Russo-Parker Constrn. Co., \$17,307.25; highway No. 5332, M. R. Klock & Co., Watertown, \$141,959.30; highway No. 5327, Newport Constrn. Co., Herkimer, \$139,448.40; highway No. 5329, Mosler & Summers, Buffalo, \$103,381.20; highway No. 5319, S. V. R. Malcolm & Son, Medina, \$49,047.50; highway No. 5381, Mitchell & Wilson Co., Niagara Falls, \$3,300; highway No. 5346, Betts & Boyce, Brown Station, \$62,661; highway No. 5328, Suffolk Constrn. Co., Huntington, \$146,879; highway No. 5250, Newport Constrn. Co., Herkimer, \$81,703.92; highway No. 5354, Thos. Carr, Troy, \$57,621.50; highway No. 5342, Swank & McIntyre, Buffalo, \$23,646.36; highway No. 5349, part 3, John C. Bradley Co., Corning, \$51,787.45; highway No. 5331, McGuire & Fahey, Hornell, \$10,994; highway No. 5353, McGuire & Fahey, \$4,414.20; highway No. 5334, Corbett & Gilbert, Watkins, \$78,100; highway No. 5379, F. B. Meckes, Long Pond, Pa., \$43,748.40; highway No. 5316, A. C. Davis, Schenectady, \$25,931.50; highway No. 5321, Wm. F. McCabe Constrn. Co., White Plains, \$10,713.30; highway No. 5357, Hastings Paving Co., New York City, \$30,466.50; highway No. 5358, Wm. P. McDonald Construction Co., Mt. Vernon, \$10,251.40; highway No. 5369, H. J. Mullen, Jamaica, \$99,729; highway No. 5360, Saml. Beskin, Fishkill, \$51,932; highway No. 5361, Jos. L. Couzzo, Yonkers, \$12,297; highway No. 5363, H. B. Sproul, Peekskill, \$32,423; highway No. 5364, H. B. Sproul, \$16,717.20; highway No. 5324, Lane Constrn. Co., Meriden, Conn., \$114,829.70; highway No. 5341, Falk & Menzies, Buffalo, \$55,976.05; highway No. 5377, Albert L. Willy, Binghamton, \$38,733.25; highway No. 1095, John H. Gordon, Albany, \$43,693.88; highway No. 5259, Mahoney & Swanson, Jamestown, \$85,847.23; highway No. 5245, Dunkirk Constrn. Co., Dunkirk, \$53,394.30; highway No. 5199, John E. Consalus, Albany, \$77,081.62; highway No. 5337, John D. Sullivan, Keeseville, \$27,665.50; highway No. 5340, Merritt Constrn. Co., Tuckahoe, \$62,494.37; highway No. 5366, Wm. P. McDonald Constrn. Co., Mt. Vernon, \$14,052; highway No. 5368, Russo-Parker Constrn. Co., Hudson, \$39,723.50; highway No. 5370, D. H. Craw, Ravenna, \$27,950.95; highway No. 5344, John H. Nelson & Co., Herkimer, \$47,574.28; highway No. 5330, Padelford & King, Sherburne, \$68,644.85; highway No. 5380, Dale Engr. Co., Utica, \$25,937.61; highway No. 5318, C. F. Sullivan, Syracuse, \$33,482.40; highway No. 5323, J. W. Brennan, Geneva, \$94,649.82; highway No. 5315, Falk & Menzies, Buffalo, \$72,543; highway No. 5382, J. A.

Culker & Co., Oswego, \$142,991.68; highway No. 5313, Lang & Horton, Schuylerville, \$44,917.50; highway No. 5286, John H. Gordon, Albany, \$47,497.75; highway No. 5335, McGreevy, McGuigan & Baum, Elmira, \$54,677.40; highway No. 5331, Byrnes & McConville Cont. Co., Ogdensburg, \$21,133.25; highway No. 5348, Shaughnessy Constrn. Co., Albany, \$120,736.61; highway No. 5352, Atlanta Construction Co., Atlanta, \$135,790.80; highway No. 5322, part 2, John E. Consalus, Albany, \$87,403.50; highway No. 5336, Wm. C. Fox, Saratoga Springs, \$110,867.50; highway No. 5372, Warren Bros. Co., \$35,492.10; highway No. 5373, Hastings Paving Co., New York City, \$74,170.70; highway No. 5374, Warren Bros. Co., \$5,739; highway No. 5375, Hastings Paving Co., \$28,383.30; highway No. 5376, Samuel Beskin & Co., Fishkill, \$67,591; highway No. 5356, Samuel Beskin & Co., \$72,128.50; highway No. 5378, Thomas Hucknall, Albion, \$47,354.11; highway No. 1105, John E. Consalus, Albany, \$47,401.50; highway No. 5338, Edgcomb Bros., Binghamton, \$119,471.25.

BRIDGES.

Bids Asked and Prospective Work.

Livingston, Ala.—Bids will be received by the Court of Co. Cmrs. of Sumter Co. at Livingston, until Sept. 25, 1912, for erecting steel and concrete State aid bridges. Apply to W. S. Kellar, State Highway Engineer for information. Certified check for \$400 required with each bid.

Tuscaloosa, Ala.—Bids will be received by the Bd. of Pub. Works of Tuscaloosa Co. at 10 a. m., Sept. 28, 1912, at Tuscaloosa, for furnishing and erecting four concrete steel bridges of the following lengths: One 60-ft., one 50-ft., two 30-ft. All to have concrete abutments and floors. For additional information, write State Highway Department. Certified check for \$400 will be required with each bid. W. S. Kellar is State Highway Engr.

Fresno, Cal.—Bids will at once be advertised for the construction of the reinforced concrete bridge across Dry Creek at Forthcamp Ave., according to plans and specifications prepared by City Engr. Jensen. The estimated cost is \$5,226.

Long Beach, Cal.—The City Council has ordered the paving of Fourth St., Juniper Ave., and a portion of State St.

Santa Barbara, Cal.—Bids will be received up to 10 a. m., October 7, by the Bd. of Spvs. of Santa Barbara Co. for the construction of a bridge across San Pablo creek at Hollister Ave.; and for the construction of a bridge across Carneros creek at Hollister Ave., La Goleta, in accordance with plans prepared by the Co. Engr. A. C. Hunt is Co. Clerk.

Waterbury, Conn.—The Cmrs. of Pub Works are planning to rebuild the Fairmont bridge in Waterville. Address Secretary of the Bd.

Salem, Ind.—Bids will be received Oct. 7 for the construction of a 30x12 beam bridge on the county line dividing Lawrence and Washington Counties. Address Joseph W. Elrod.

Mason City, Ia.—Contracts for the construction of two more permanent bridges will be let by the Cerro Gordo Co. Bd. of Spvs. in the near future. One of these bridges will be east of Portland, a 224 ft. concrete slab affair. The other a 30-ft. girder bridge, will be located in Mt. Vernon Twp. C. E. Sommers is Spv.

Hutchinson, Kan.—It is stated that a new concrete bridge may be built over the Arkansas River at the south end of Main St., and that the Co. Cmrs. probably will submit a bond proposition to the voters of Reno Co. at the November election for \$100,000 for bridge construction. Address Co. Cmr. Fay Smith.

Leavenworth, Kan.—Bids will be received Oct. 7 for the construction of new concrete bridge on the line between Leavenworth and Wynadotte Counties, construction of a concrete and steel

bridge on Kansas City Road, construction of a bridge between Ackerland and Springdale on Fall Creek, construction of a new concrete arch on East and West Road, and construction of concrete arch on Burke Road, according to plans and specifications on file in the office of J. A. Hall, Co. Clerk of Leavenworth Co.

Winfield, Kan.—The Cowley Co. Cmrs. will build a cement bridge across the Beaver River. Address Co. Surv. at Winfield.

Charenton, La.—The Police Jury of St. Mary parish have appropriated \$5,000 and have asked for bids for the construction of a bridge over Bayou Teche. Address Clerk of St. Mary Parish at Charenton.

Boston, Mass.—Cmr. Rourke has submitted a request to Mayor Fitzgerald for \$80,000 for a new bridge over the Mystic River at Chelsea South. This will provide only for a temporary bridge in lieu of a permanent structure to be built later.

Jackson, Miss.—The Bd. of Spvs. is advertising for bids for a steel draw bridge to be built across Pearl River about one mile north of Jackson. The plans and specifications for the structure are on file with the Chancery Clerk of the Co.

Kansas City, Mo.—The Bd. of Pub. Works has directed Waddell and Harrington, engineers, to submit at once detailed drawings for the widening of the Main St. viaduct from 60 to 80 ft. The cost of the improvement has not been estimated. The Commercial Improvement Assn. has contributed \$30,000 and the city has set apart \$20,000 to meet the expense.

Santa Fe, N. M.—Sealed proposals will be received by the Co. Cmrs. of Santa Fe Co. up to noon, Oct. 18, 1912, for furnishing all material for a bridge to be built at Arroyo Atascoso, near the town of Galisteo.

Cleveland, O.—Bids will be received Oct. 5 for the construction of a concrete culvert, Brookpark extension, Penna-Brooklyn, in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Co. Surv. Address John F. Goldenbogen, Cuyahoga Co. Clerk.

Sealed proposals will be received at the office of the Bd. of Cmrs. of Cuyahoga Co. until 11 a. m., Sept. 28, 1912, for the construction of a balustrade for concrete bridge over Nine Mile Creek, Lake Shore Blvd., E. Cleveland Twp., in accordance with the contract and specifications to be furnished by Frank R. Lander Co. Surv.

Consocton, O.—Bids will be received Sept. 23, 1912, for erecting the Caballo bridge, in accordance with the plans and specifications on file in the office of Frank Mowrey, Co. Aud.

St. Clairsville, O.—The Belmont Co. Cmrs. will expend \$9,000 building bridges. Address Co. Clerk.

Vinita, Okla.—The Council has advertised for bids for the construction of a bridge. Address City Engr.

Media, Pa.—A county bridge will be constructed over Chester River at Fifth St., Chester.

Huntsville, Tex.—Bids will be received Nov. 11 for the erection of two steel bridges in accordance with plans and specifications on file in the office of A. T. Randolph, Co. Clerk.

Elkins, W. Va.—Bids will be received Oct. 8 for the erection of a bridge at Valley Head, spanning Windy Run. Span, 40 ft.; roadway, 14 ft.; concrete or stone abutments, steel or concrete superstructure, with concrete or wood floors. Address P. A. Rowan, Clerk.

Merrill, Wis.—Bids will be received Sept. 24 for the erection and construction of a trestle and piling bridge to be built across Prairie River at the North end of Mill St. Address Win J. Kyes, City Clerk.

Bids Received and Prospective Work.

Richmond, Minn.—The contract for a new steel bridge across the Sauk River, known as Zumwalde's Bridge, was let

to the Continental Bridge Co. of Chicago at \$8,193.

BONDS.

Fullerton, Cal.—A bond issue of \$132,000 for street paving has been voted here.

Los Catos, Cal.—The citizens will hold an election soon to vote upon a bond issue of \$130,000 for constructing good roads.

Ontario, Cal.—Bonds to the amount of \$75,000 were voted by the citizens on Aug. 29. Of this sum \$72,000 is for street improvements.

Orange, Cal.—The Bd. of Spvs. of Orange Co. has sold the \$100,000 bond issue for road improvements and bridges, and will advertise for bids for the first portion of the work.

Sonoma, Cal.—Sonoma Co. contemplates a bond election to the amount of \$1,000,000 for construction of a system of good roads throughout the county.

MISCELLANEOUS.

Fresno, Cal.—Bids will be called for at once by the Bd. of Trustees for furnishing a street oiling machine.

Santa Barbara, Cal.—The Santa Barbara Co. Bd. of Spvs. is in the market for a 10-ton road roller, steam or gasoline type. Supervisor A. W. Conover has the matter in charge.

Washington, Pa.—Sealed proposals will be received by the Co. Controller at Washington, Pa., until noon, Sept. 30, 1912, for furnishing vitrified paving brick or block to be used in the construction of the Pigeon Road. John M. Moffitt is Co. Cont.

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NEW YORK, SEPTEMBER 28, 1912

Number
13

Recommendations as to California Highways

A committee, consisting of C. P. Jensen, City Engineer of Fresno, California; S. J. Van Ornum, City Engineer of Pasadena, Cal., and J. J. Jessup, City Engineer of Berkeley, Cal., appointed at the Santa Barbara convention of the League of California Municipalities, for the purpose of watching the progress of the State Highway Commission and reporting its findings, has recently submitted a progress report. After reviewing the highway act under which the Highway Commission is working, the present condition of the work and the plans of the commission, all of which were covered in a previous issue of this journal ("California's State Highway," by Austin B. Fletcher, Highway Engineer, "Good Roads," Sept. 7, 1912, p. 100), the committee goes on to make certain recommendations as to the character of the roads to be built. The total mileage of trunk and lateral highways to be built is approximately 2,700 miles. Eighteen million dollars will be available for this work, which amount, if spread equally over the entire system, would permit the expenditure of only \$6,667 per mile. This, it is pointed out, is insufficient for the construction of good roads of standard design.

The report also quotes Mr. Fletcher's remarks in an address before the Pacific Highway Association in San Francisco in August of this year, in which he outlined briefly the general character of the roads which the commission proposes to build. These comments were printed in the article to which reference has already been made and will not be repeated here.

The remainder of the report which embodies the suggestions of the committee is printed herewith.

"We would submit that it is our opinion that a plan of procedure which would fulfill the requirements of the act would be that where pavements are constructed at all, they be constructed of a character which is known to be the most durable, permanent and practicable under local conditions; this, of course, would mean that a smaller percentage of paved roads and a greater proportion of graded roads would be constructed. We feel that whatever work is done should be done with the end in view of securing the best pavement known to highway builders today, thus reducing to the smallest degree possible, the factor of future cost of maintenance for which, by the way, no specific provision has been made, to our knowledge. We believe that even though some localities would have to be satisfied with an ordinary graded highway, or perhaps an oil surfaced highway, under the present bond issue, this would be a far better course to pursue, not only for the reason that the best pavement is none too good, but for the further reason that when the bond issue was exhausted the Commissioners could go before the people and claim that whatever work was done has been done according to the best known construction and that the graded roads would be finished and could be used as subgrades for future pavements if the people would see their way clear to vote an additional bond issue.

"As a commentary on the matter of oil macadam, we

would call to mind that Los Angeles County alone, spent \$3,500,000 on oil macadam highways, and that in the latter part of 1911, when practically all of the bond issue was spent, the Grand Jury of the county met and in a final report stated, as we recall the words, that, 'the oil macadam in Los Angeles County is an absolute failure.'

"It is our belief that particularly up and down the San Joaquin Valley, motor trucks will come into use immediately upon the completion of the highway for the purpose of transporting freight from terminal points, and this factor should be taken into careful consideration before specifications are adopted for such highways. In all other respects, as far as the information has come before us, plans of work contemplated by the commission are very excellent and worthy of recommendation.

"Suggested Specifications—Having in mind the increasingly greater traffic demands which will be made after the completion of the highway, we would suggest three classes of pavement as being much more permanent and satisfactory in every way than those proposed:

"1. A standard pavement consisting of a cement concrete base, and a bituminous wearing surface at least 2½ ins. thick, constructed according to best modern practice; this form of pavement has been proven to be successful in all large cities and is considered standard by all municipal engineers.

"2. A pavement consisting of a 5-in. cement concrete base, as before, but overlaid with a 2½-in. thickness of bituminous rock, similar to many pavements in San Francisco and other cities.

"3. A pavement commonly known as asphalt concrete, consisting of a base course 3 ins. thick and a wearing surface 2 ins. thick, each course to be separately rolled to complete resistance. This form of pavement has been in use for many years and has proven entirely satisfactory.

"A bituminous concrete similar to the asphaltic concrete might be used to advantage along the line of the coast route. For the present highway purposes in most localities, we consider that the asphalt concrete form of pavement would be in all respects, the best pavement to be had under existing circumstances.

"Recommendations—In conclusion we would remind your body that approximately 70 per cent. of the burden of taxation will fall upon the incorporated cities. If poor pavements, or experimental pavements were laid between cities, they would be the greatest sufferers and would, therefore, have the best right to be heard in the matter of pavements. In view of the seriousness of adopting improper specifications we would recommend that you give the matter your careful and immediate attention."

Plans to Avoid Grade Crossings in Ramsey County, Minn.

At a recent conference between the county commissioners of Ramsey County, Minn., in which the city of St. Paul is situated, and the officials of the Northern Pacific Railroad, it was agreed that tentative plans and specifications should be drawn for a change in the northern section of the St. Paul, White Bear and Bald Eagle macadam highway so as to avoid crossings involved in the construction

of a spur of the railroad to connect the new yard near Goose Lake with the main line.

The spur has a twelve degree curve, which is objected to by the county commissioners. It crosses the macadam road and the Minneapolis road and connects with the Minneapolis Railway at the Otter Lake road.

The tentative proposition is to change the macadam road so that it will cross the main railway line south of the proposed spur, follow along east of the main line, and connect with the present macadam road about 100 ft. east of the main line. This would avoid the spur crossings and leave one main line crossing as at present.

It is proposed to connect the Minneapolis highway with the macadam road at the point where the change begins. The cost of the change will be borne by the railway company. Some of the commissioners are said to favor a crossing over the spur and the main tracks. County Surveyor Armstrong states that such a bridge would be about 1,500 ft. long with four per cent. grade approaches, and would cost about \$100,000.

Second Annual Report of the British Road Board

(Special Correspondence.)

The second annual report of the British Road Board, which has recently been published, shows that the income of the road improvement fund for the period extending from the establishing of the board in May, 1910, to March 31, 1912, amounted to \$10,921,570. Of this total amount, \$6,464,305 was obtained from motor spirit duties, \$4,317,685 from carriage license duties and \$139,580 from interests on investments.

A summary of the grants and loans made up to March 31, 1912, shows the sums apportioned to have been expended as follows: Improvement of road surfaces, \$2,233,860; widening and realignment, \$284,165; road diversions, \$91,380; reconstruction and improvement of bridges, \$75,640 and new roads and bridges, \$14,640, making a total of \$2,699,685.

In the report, reference is made to two distinct problems connected with roads. One of these arises from the growth of population in cities, towns and other urban areas, which has led to the necessity for the extensive reconstruction of roads and streets to provide for the resulting increased volume of traffic. The other arises directly from the introduction and rapid increase of motor traffic and applies principally to roads passing through rural areas and to interurban roads, the surfaces of which were, and over a very large mileage still are, insufficient in strength and unsuited in character for the use of the traffic they are called upon to carry. Both of these problems had brought about situations of great difficulty for highway authorities, but they affected the general interests of the community in different ways and raised very difficult questions in relation to the road improvement fund.

Reference is also made in the report to the proposed new western approach road in London. It had been estimated that the scheme, if carried out in its entirety, would involve a total expenditure of \$8,750,000, of which the Road Board had intimated its willingness and ability to contribute \$4,250,000. The board proposed to continue negotiations with regard to the plan suggested, subject to such modifications as may be consistent in securing its main objects. It would, it is held by the board, be inadvisable to take up other schemes involving any large expenditures, either in London or elsewhere, until a final decision has been arrived at with respect to the western approach, which is regarded as one of the most desirable works of its kind at present under consideration.

Oklahoma Court Ruling on Municipal Bond Certification

According to an opinion by Justice Hayes of the Supreme Court of Oklahoma, the attorney general, as bond commissioner of that state, is not required to examine and certify street improvement bonds issued by a municipal corporation.

An issue of \$150,000 street improvement bonds, issued by the city of Lawton, which was underwritten by a syndicate of bankers in New York, was recently held up pending the Supreme Court's decision, after an expert on municipal law had advised that the validity of the bonds be established under the Oklahoma statute.

The bonds are payable from assessments levied upon lots and tracts of land bounded by the proposed improvements. It is said that the city to collect the assessments, pledged the credit and revenues of the city for the purpose of carrying out the stipulations. An action in mandamus was brought in the District Court of Oklahoma County to compel the attorney general as ex-officio bond commissioner to pass upon the issue. The attorney general had refused to make an examination on the ground that the bonds were to be paid by special assessments against the property bounded by the improvements made with funds procured by the sale of securities and were not a direct obligation of the municipality. The writ was denied in the District Court and the case was taken to the Supreme Court on appeal. In his opinion, affirming the judgment of the lower court, Justice Hayes called attention to the fact that the bonds involved in the case are not public securities, as, while they were issued by the authorized officers of the municipality under the provisions of the law, they did not evidence an indebtedness or liability on the part of the municipal government, as provided by the bonds themselves and the statute under which they are issued.

Water Breaks on Pennsylvania Roads to be Abolished

State Highway Commissioner Bigelow of Pennsylvania, who recently completed a 2,000-mile tour through New England inspecting highways of that section, has announced that he has ordered the abolishment of water breaks or "thank-ye-mams" on all the highways throughout the state of Pennsylvania.

Commissioner Bigelow states that these water breaks, which consist of high ridges of earth built across the road on steep grades for the purpose of diverting water into the gutters after rain and a once familiar institution throughout New England, are now found in only one state, Vermont, and it is his opinion that traffic is increasing so rapidly in that state that the removal of the water breaks there is only a matter of a short time.

Street Paving in El Paso, Texas

According to a statement recently issued by Herbert Nunn, City Engineer of El Paso, Texas, there have been constructed in the city, since 1906, more than 25 miles of hard surfaced roadway 50 ft. wide. This work has been done at a cost, up to August 20 of the current year, of \$1,295,250.18. The total number of square yards of paving is 737,244.91. Of this amount 458,386.49 sq. yds. are bitulithic, 76,826.72 are asphalt macadam, 105,464 are petrolithic and oil macadam, and 96,567.70 are classified as miscellaneous. In addition to this there are 11,244.42 square yards of cobblestones in alleys.

An effort has been made to limit all grades to 10 per cent., it being considered that any grade in excess of this is prohibitive to traffic. It is stated that this method is being met with serious opposition by property owners, especially those interested in promotion.

GOOD ROADS

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Extensive Paving in Portland, Oregon

Paving contracts, aggregating approximately \$1,500,000 in cost, are under way and nearing completion on the east side of the city of Portland, Ore.

In Alameda and Olmsted Park a single contract for the construction of 11 miles of hard surfaced road is under way at a total cost of \$150,000 and is practically finished. It covers two additions with hard surface and connects with hard surfaced pavements on Prescott and Alberta Sts.

The largest single street improvement undertaken in Portland this year is that of constructing cement sidewalks, pavements and sewers on Sandy Blvd. at a total cost of nearly \$400,000. It is expected that this work will be finished by the end of the year.

A hard surfaced district has just been finished in the Euclid Heights addition between Center addition and Rose City Park. Work is also being pushed in the City View Park improvement district and also in Westmoreland, where all the streets are to be paved.

The east side of Milwaukee St. has been paved between Holgate St. and Bybee Ave. and the street has been graded through to Nehalem Ave. at Sellwood. The entire improvement of this street will probably be completed before the rainy season arrives.

In Eastmoreland the work of constructing several miles of hard surfaced pavements is being finished. Petitions have been filed for about \$50,000 worth of hard surfaced pavements around Kenilworth, but while it is planned to start the improvement of all streets in Kenilworth between the Southern Pacific car shops and E. 42d St. in the near future, it is not probable that the work will be undertaken this year.

Among the projected improvements is that of paving the Wabash St. district, which it is estimated will cost \$103,000. Liberty and other streets in Woodlawn are to be improved at a cost of \$19,500, and it is proposed to pave Fremont from E. 9th to E. 33rd Sts. at an approximate cost of \$73,000. Lombard St. is to be paved from Wabash St. to Patton at a cost of \$52,100. What is called the Williams Ave. district on the Peninsula is a new district where the improvement will cost \$44,633. Spokane Ave. will also be paved in the near future at an estimated cost of \$44,015, and Umatilla Ave. in Sellwood will soon be paved between E. 19th St. and Grand Ave., the work costing about \$40,000.

A number of street improvements are also projected in the southeastern side in what is known as the Mt. Scott

district. Part of this work is also under way. E. 50th St. is being cut through from Division to Powell Sts. E. 67th St. has been graded between Powell St. and Foster Ave. and improvements to the extent of \$3,963 have been made on High St. in the Mt. Scott district.

A contract for paving Rhone St., between Milwaukee and E. 7th Sts., has recently been awarded at \$10,816. In the matter of the proposed extension of E. 17th St. through Midway, notices of assessments have been sent out to property owners, and while the expected opposition has been encountered, it is not expected that the extension project will be defeated. The opening of this extension involves the appropriation of property estimated to be worth \$16,000, but the assessments were spread over all of Sellwood in order to make the burden light on individual property owners, and there is not much doubt but that the extension will be opened as it is considered an absolute necessity for the advancement of the territory.

Proposed Road in Washington

At a recent meeting of a commission composed of state legislators, engineering officials from King, Seattle and Snohomish Counties, Washington, and officers of the Cascade Scenic Highway Association, held at Seattle, a project for the construction of an automobile road between Seattle and Wenatchee, a distance of 47 miles, was approved. The indorsement was given after the commission had covered a portion of the proposed route between Scenic and Cascade, about 12 miles long. This section is considered to present the most difficult engineering problems of the entire route. According to present plans an abandoned switch back road used during the construction days of the Great Northern Railroad is to be converted into a roadway and it is estimated will cut down the bulk of the cost of constructing the most difficult portion of the proposed road. It is said that the grade at no point will exceed five per cent.

Estimates of the cost run up to a maximum of \$10,000 a mile, while the total cost will amount to about \$145,000, in the opinion of those interested.

Officers of the Cascade Scenic Highway Association have decided that a request for this amount should be made, King and Snohomish Counties to contribute \$35,000, Chelan County \$25,000 and the state of Washington \$50,000.

Road Contracts Approved in Alabama

Contracts involving the expenditure of \$66,460 were recently approved by the State Highway Commission of Alabama.

The various contracts call for the construction of state aid roads in eight counties of the state and involve an expenditure of amounts ranging from \$4,000 to \$17,000.

The counties for which contracts were awarded and the amounts to be expended in each are as follows: Lee, \$8,000; Franklin, \$12,000; Blunt, \$4,000; Jackson, \$4,000; Russell, \$5,460; Elmore, \$8,000; Coffey, \$8,000 and Butler, \$17,000. Except in Butler and Franklin counties the state will contribute one-half of the amount expended. In Franklin County \$4,000 will be contributed by the state, \$4,000 by the county and \$4,000 by the people.

In Butler County in which the contract calls for \$17,000 the state will contribute \$4,000, the county \$10,000 and other sources \$3,000.

A highway bridge across the Richelieu River between St. Johns and Iberville, P. L. is in course of construction and will be completed, according to present plans, during the later part of the current year. The bridge will be of steel and concrete, will cost about \$150,000 and will replace an old wooden toll bridge.

Coming Meetings

Sept. 30—Oct. 5. — American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

The voters of Maine at the recent state election ratified the amendment to the constitution which permitted the issue of \$2,000,000 in bonds, proceeds of which will be used in the improvement of state highways.

The final count of the vote on amendment 29 of the Ohio constitution show the total votes in favor of the proposal to be 272,564. The votes cast against it were 274,582, the proposal being lost by the small margin of 2,018.

A stretch of concrete road one mile in length will be built as an experiment in Rockville, Ind., by the Commissioners of Park County. This will be done as the result of a recent inspection of the concrete roadways of Wayne County, Mich.

The federal government of Mexico has adopted the French system for keeping the public highways in repair. Road overseers will be appointed for each public road, and each man will be given charge of about one mile of road to inspect and keep in repair. The first highway to which the system will be applied is the one running between the capital and Puebla.

There was spent in the Province of Quebec, during the year 1911, about \$445,000 in the improvement of highways. About \$170,000 of this was spent on colonization roads in the newer sections of the Province and \$250,000 on the older roads. \$125,000 was expended in the construction of new iron bridges throughout the Province. Considerable progress was made in highway improvement through the enactment of better road laws and the inauguration of a system of instruction of the rural population in road building.

Grade crossing elimination campaign involving several of the Erie Railroad crossings in Buffalo, N. Y., is contemplated. The cost of the work will be about \$1,000,000.

The special joint Congressional Committee, for which the post-office appropriation bill, recently passed by writing to the various American ambassadors and ministers, and to the governors of states throughout the country, asking them to forward information regarding road problems in their jurisdictions, and requesting suggestions. This is preliminary to the sessions of the committee, which will begin in November.

The annual meeting of the Northern New York Development League, which was recently organized for the purpose of promoting good roads in the northern section of the state, was held August 28, at Tupper Lake. Arrangements for the meeting were made by Howard D. Hadley, President of the Quebec-Miami International Highway Association. Addresses were delivered by several well known men including Edwin A. Merritt, Speaker of the New York State Assembly, Frederick H. Elliott, Secretary of the Touring Club of America, Job A. Hedges and Irving Bacheller.

The municipality of Vina del Mar, a suburb of Valparaiso, Chile, has decided to expend the greater part of an appropriation of \$1,302,000, United States gold, in highway improvements; \$525,000 will be spent in building macadam base, \$231,000 in concrete on macadam, and \$237,000 in natural rock asphalt. In addition to this, \$105,000 will be spent in improving hill roads. Something over one-third of the expense will be borne by the abutting property owners, and the municipality will float bonds to defray the balance of the cost. The population of the city is about 30,000.

Two committees have been appointed by the Oklahoma Good Roads' Association to direct the work of securing the enactment of laws by the Legislature at the next session for the construction of a system of improved highways. The program, as outlined by the association, contemplates a general revision of all state laws affecting roads, including those enacted at the last session of the Legislature. The association has been in communication with the candidates of all parties for the Legislature, and out of 100 districts 86 are favorable to new legislation along the lines suggested.

Personal Notes

W. M. Dunlap has been elected City Engineer of Bristol, Va.

L. B. Mims has been reelected Superintendent of Streets of Pensacola, Fla.

Daniel J. Hennessey, Superintendent of Public Works of Fulton, N. Y., has resigned.

Lauraine L. Parke, at one time Assistant City Engineer of Salt Lake City, U., died near that city September 11.

John O. Potter, for several years City Engineer of Muncie, Ind., and lately in business as a contractor in that city, died September 6.

John Hennessey, a contractor of Piqua, O., has been appointed a highway inspector by State Highway Commissioner James R. Marker.

C. J. Renner of Mt. Vernon, N. Y., has been appointed City Engineer and Superintendent of streets, water and sewers of St. Albans, Vt.

The Minister of the Department of Gobernacion of the Federal Government of Mexico has appointed Alberto Pani Director of Public Works. He will be in charge of carrying out the plans of the government for establishing an extensive system of highways throughout the country. He is maturing plans for the work as rapidly as possible.

Trade Notes

The Erie Machine Shops of Erie, Pa., is distributing among its patrons a paper weight in the form of a bronze miniature of its tandem road roller.

The Strauss-Bascule Bridge Co. of Chicago has been appointed designing engineer, during the past two months, of a 65-ft. single leaf bridge in Camden, N. J., an 82-ft. double leaf bridge in Port Huron, Mich., a 58-ft. single leaf bridge in Elizabeth, N. J., and a combined railway and highway bridge 3,000 ft. long across the Arkansas River at Pine Bluff, Ark.

The Rowe Ring-Point Co. of Hartford, Conn., is distributing literature descriptive of the Cat Foot cushion horseshoes, designed to insure horses against slipping on icy roads and wet pavements. The bottom of the shoe contains a wide, hollow groove in which is fitted a length of tarred rope which, it is claimed, grips the pavement and prevents slipping. It is stated that the device has been used in Europe for 30 years.

CONTRACT NEWS

CONTRACTS PENDING

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ROADS AND STREETS.

Bids Asked and Prospective Work.

Argenta, Ark.—The council is planning to pave additional streets. Address City Engr.

Fresno, Cal.—The Bd of Spvs. have ordered surveys to be made of the extension of Sand Creek road to General Grant Park. The cost will be from \$12,000 to \$15,000.

The Spvs. have voted to macadamize Van Ness Ave. for a distance of $\frac{3}{4}$ of a mile. The estimated cost of the improvement is \$15,000.

Los Angeles, Cal.—Bids will be received up to Sept. 30, by the Bd of Spvs. for the construction of 18-in. deep cement curbs in road Dist. 11 at Sherman, estimated cost \$6,260. Sidewalks estimated to cost \$13,945 are to be constructed along same streets under separate contracts. Bids will also be received for constructing 5 ft. cement sidewalks in Road Dist. No. 2, at Sherman, estimated cost \$23,945, plans prepared by engineer H. C. Hartley, on file in office of the Bd. Construction of curb, estimated cost \$6,260, to be laid along same streets.

National City, Cal.—A boulevard extending from San Diego to National City, following the coast line, is planned by the Bd of Trustees of National City. It will have an asphalt roadway 30 ft wide.

Riverside, Cal.—The Riverside Co. Spvs. have voted to spend \$55,000 for constructing permanent macadam and rock ballasted roads and \$20,000 for decomposed granite and oiled roads.

San Diego, Cal.—The San Diego Sub-division Company will let the contract for constructing cement curbs and sidewalks and grading streets in a tract adjoining Olivewood Terrace, near National City.

San Francisco, Cal.—Property owners have been authorized to improve streets under private contract, as follows: Curb and pave DeWolf St. between Sicksels Ave. and Sherwood Ave. Miguel St. between Arlington and the railroad tracks. Eighth Ave. between Moraga and Lawton Sts. Pave, etc., on Geary St. and 18th St. between Kansas and Vermont Sts.

Atlanta, Ga.—Sealed proposals will be received at the office of the Chief of Construction until 3 p. m., Oct. 4, 1912, for furnishing material and labor for paving East Mitchell St. from Whitehall St. to Washington St. with vitrified brick. R. M. Clayton is Chief of Construction.

Champaign, Ill.—The Council is planning to pave First St. Address City Clerk.

Peoria, Ill.—Bids will be received September 30 for the construction of cement side walks on several streets. Address S. W. Eckley, Pres.

Indianapolis, Ind.—The Bd. of Public Works has adopted a declaratory resolution for widening 38th St. from Capitol Ave. to Fall Creek, to a uniform width of 100 ft.

Jeffersonville, Ind.—The Bd. of Cmrs. of Clark Co. will receive sealed bids until 10 a. m., October 7, 1912, at the Court House in Jeffersonville, for the construction by grading, draining and paving with crushed stone or other paving material, as set out in the plans and specifications now on file in the Auditor's office of Clark Co. of the following highway: Beginning on the line dividing Nos. 146 and 164 of the Illinois Grant, said line being the line dividing Silver Creek and Carr Twp., thence over, along and upon the old New Albany and Salem State road where the same passes through said Carr Twp. in a northwesterly and westerly direction through Illinois Grant No. 164 and sections Nos. 13, 14 eleven and ten in Twp. one south, range six east, and also continuing over, along and upon said Old New Albany and Salem State Road through Section No. 9, in Twp. one south, range six east, to a point where the Bridgeport road intersects said Old New Albany and Salem State Road in said Section No. 9, said highway being 4.782 miles in length.

Junction City, Ind.—Bids will be received October 7, for the construction of the proposed highway in Union Twp. Address Harold Guthrie, Co. Aud.

Terre Haute, Ind.—Sealed bids will be received by the Bd. of Pub. Works of the City of Terre Haute until 4 p. m., Sept. 30, for the improvement of South Seventh St. from the north property line of Hulman St. to the south property line of Voorhees St. by grading and macadamizing said roadway from curb line to curb line to a uniform width of 40 ft. from Hulman St. to Idaho St., and to uniform width of 36 ft. from Idaho St. to Voorhees St., with asphalt macadam, placing the necessary marginal street curbing and curbing said roadway with cement combined or cut stone, curb and gutter, and paving the unpaved portions of the sidewalks thereof with cement concrete six ft. out from property line, and grading the ungraded portions thereof of lawn space, all as shown on the plans and specifications thereon on file in the office of the Dept. of Pub. Works. P. B. Walsh is Pres. Bd. of Pub. Works.

Clinton, Ia.—The City Eng. has prepared plans for paving Second St. Cost of improvement, \$63,711. Address City Eng.

Manhattan, Kan.—Bids will be received at the office of the County Clerk in the Court House in Manhattan, Kansas, up to noon, October 12, 1912, for the construction of about 3,200 ft. of rock road in the Ashland Road Dist., Ashland Twp., Riley Co., in accordance with the survey, plans, profiles and specifications now on file in the office of the Co. Clerk at Manhattan.

Baltimore, Md.—The City Paving Commission has decided to pave the following streets with bituminous concrete: McMechen St. from McCulloh St. to Druid Hill Ave.; Lombard St. between Chester and Collington Sts.; Chester St. between Lombard and Pratt Sts.; High St. between Front St. and Fallway. Material will be granite block. It was also decided to pave Water St. between Gay and Frederick Sts. with vitrified brick, and between Frederick St. and Market Pl. with granite block. On Frederick St. between Lexington and Pratt Sts. granite block will be used with asphalt filler.

Carthage, Mo.—The St. Comr. has been directed to advertise for bids for paving Macon St. from Grand to Prospect Ave., and Main St. to Second St. Address City Clerk.

Kansas City, Mo.—The Council will arrange for paving Wyandotte St. Address City Clerk.

Orange, N. J.—An ordinance has been passed by the City Council authorizing the laying of a concrete sidewalk on the easterly side of North Maple Ave. between Rutledge and Lafayette Aves.

Akron, O.—An ordinance has been passed determining to proceed with the improvement of Clark St. from Bruner to Mathews Sts. by grading, curbing and paving with brick.

Cincinnati, O.—Bids will be received Oct. 4, for the improvement of the Union Cemetery Road from the Loveland and Madeira road to the Montgomery Pike. Address Stanley Struble, Pres. Bd. of Loc. Imps.

An ordinance has been passed determining to proceed with the improvement of Iowa St. from McGregor Ave. to its southern terminus by paving the roadway with bituminous macadam and constructing cement curbs.

An ordinance has been passed determining to proceed with the improvement of Slatley Alley from Church St. east and west by paving with concrete. Chas. Sawyer is Acting President of the City Council.

An ordinance has been passed determining to proceed with the improvement of Wingate Alley between Cutler and Jane Sts., by paving with brick.

Cleveland, O.—The following ordinances have been passed by the City Council: to levy and assess a special tax to pay the cost of grading, draining, setting curbs and paving E. 67th St. from St. Clair Ave. to Lake Shore Michigan Southern R. R.; levying and assessing a special tax to pay the cost of grading, draining, paving and setting curbs on Burke Ave., S. E. from E. 78th St. to E. 83rd St.; to levy and assess a special tax to pay the cost of grading, draining, setting curbs and paving Poloni Ave. and E. 71st St.; to levy and assess a special tax to pay the cost of grading, draining, setting curbs and paving W. 41st St. from Dennison Ave., S. W. to a point 521 feet south; to levy and assess a special tax to pay the cost of grading, draining, setting curbs and paving W. 22nd Pl. from Dennison Ave., S. W. to a point 448 feet north; to assess a special tax to pay the cost of grading, draining, setting curbs and paving Armitage Ave. S. E. from E. 93rd St. to E. 92nd St., and from Cannon Ave., S. E. to Armitage Ave., S. E.; to levy and assess a special tax to pay the cost of grading, draining, setting curbs, paving and improving Colgate Ave. from W. 73rd St. to W. 80th St.; to levy and assess a special tax to pay the cost of grading, draining, setting curbs, paving and improving Hulda Ave., S. E., from Woodhill Road, S. E., to the city limits.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a waterbound gravel macadam. The Owl Creek Road in Union Twp., Pike Co. Length, 10,560 ft. Width, 10 ft. Estimated cost of construction, \$2,373.60. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a waterbound gravel macadam, the Piketon Richmondale road, Pike Co. Length, 5,280 ft. Width, 10 ft. Estimated cost of construction, \$2,829.55. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a bituminous surface treated concrete pavement, The Lake Shore road, in Vermillion Twp., Erie Co. Length, 5,300 ft. Width, 12 ft. Estimated cost of construction, \$7,137.30. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a waterbound macadam, the Delphos & Ft. Jen-

nings road, in Jennings Twp., Putnam Co. Length, 18,200 ft. Width, 14 ft. Estimated cost of construction, \$10,716.99. Plans and specifications are on file in the office of the Township Trustees and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a water-bound gravel macadam, the Grassy Fork road in Milfin Twp., Pike Co. Length, 11,070 ft. Width, 10 ft. Estimated cost of construction, \$3,558.60. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a water-bound macadam and concrete, the Waverly & Beavertown road, in Pee Pee & Seal Twp., Pike Co. Length, 5,230 ft. Width, 12 ft. Estimated cost of construction, \$4,123.75. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with brick for heavy traffic, the Akron Canton road, in Springfield Twp., Summit Co. Length, 10,200 ft. Width, 13 & 14 ft. Estimated cost of construction, using sandstone curb, \$31,163.98. Estimated cost of construction, using concrete curb, \$29,720.95. Plans and specifications are on file in the office of Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a water-bound gravel macadam, the Big Basin road, in Newton Twp., Pike Co. Length, 4,081 ft. Width, 10 ft. Estimated cost of construction, \$3,168.06. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with brick for heavy traffic, the Wadsworth Wooster road, in Wadsworth Twp., Medina Co. Length, 4,081 ft. Width, 10 ft. Estimated cost of construction, \$9,654.42. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with a water-bound macadam, the Sinking Springs road, in Milfin Twp., Pike Co. Length, 5,230 ft. Width, 12 ft. Estimated cost of construction, \$2,778. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Dayton, O.—The following ordinances for street work have been passed by the City Council: For establishing the grade of the alley west of Missouri Ave. from Heaton Ave. to the first alley south of Heaton Ave.; establishing the grade of the alley south of Heaton Ave. from Gunckel to Erie Ave.; for proceeding with the improvement of Bolander Ave. from Cincinnati St. to Broadway; for proceeding with the improvement of Miami Chapel Road from Cincinnati St. to the Big Four Railroad; declaring it necessary to improve the first alley south of Margaret St. from the first alley east of Wayne Ave. to the first alley west of Gunckel Ave.; declaring it necessary to improve the alley south of Glencoe Ave. from Wayne Ave. to Gunckel Ave.; for reestablishing the grading of the alley south of Lorain Ave. from St. Paul Ave. to St. Joseph Ave.

Lima, O.—An ordinance has been passed levying a special assessment upon the lots and lands benefited by the improvement of Jameson Ave. from Elm St. to the Al-lentown Road by paving with macadam treated with Tarvia, grading and installing cement curbs and gutters. M. S. Bowser is President of the City Council.

Lisbon, O.—Sealed proposals will be received at the office of the Co. Cmrs. of Columbiana Co. until 1 p. m., Sept. 30, 1912, for the grading and paving with brick of 4,017 ft. of road in Washington Twp.; shipping point Salineville, Ohio. Specifications, plans and profiles are on file in the office of the Co. Cmrs. and Co. Aud. of Columbiana Co., Ohio. H. C. McCammon is Pres. Bd. of Co. Cmrs.

Youngstown, O.—An ordinance has been passed levying special assessments for the improvement of Penn Ave. between Himrod Ave. and Oak St.

An ordinance has been passed levying a special assessment for the improvement of Woodland Ave. between Pine St. and South Ave.

An ordinance has been passed levying special assessments for the improvement of Prospect St. between Himrod Ave. and Oak St.

An ordinance has been passed providing for the levying of special assessments for the improvement of Oxford St. between Foster St. and Belmont Ave. by paving.

An ordinance has been passed determining to proceed with the improvement of Empire St. between Hillman St. and Glenwood Ave. by paving. Sol. S. Davis is President of the City Council.

Port Arthur, Tex.—The City Cmrs. have decided to pave Proctor St. and Houston Ave., with Texaco.

San Antonio, Tex.—Bids are being asked for the paving of Sixth St. between East Ave. and Pedernales St.

Salt Lake City, U.—Sealed proposals will be received at the office of the Bd. of Cmrs. until 10 a. m., Oct. 1, 1912, for grading, constructing curb and gutter and paving with Utah rock asphalt Fifth East St. from Tenth South to Twelfth South St., paving extension No. 33. Plans, instructions to bidders, specifications and forms for contract and bond are on file in the City Engineer's office. Noble War-rum is City Recorder.

Sealed proposals will be received until 10 a. m., Oct. 1, 1912, for grading and constructing curb and gutter on all streets not curbed and guttered from "C" St. to "N" St., inclusive, between South Temple St. and Third Ave., curb and gutter extension No. 25; and on all streets not curbed and guttered from "N" St. to Virginia St. between South Temple St. and Third Ave., curb and gutter extension No. 26.

Progreso, Mexico.—The sum of \$40,000 will be spent by the authorities in paving streets.

Bids Received and Contracts Awarded.

Los Angeles, Cal.—The following bids were received for improving West Adams St. from Sixth ave. to the west city limits; Fairchild-Gilmore-Wilton Co., 17.9c for asphalt paving, 30c for curb, 16c cement gutter, 42c granite block gutter, \$3,000 for storm drains; Benj. Ford, 19.5c paving, 35c cement curb, 18c gutter, 43c granite block gutter, \$3,500 for storm drains; Barber Asphalt Paving Co., 18.2c paving, 35c curb, 14.9c gutter, 43.6c granite block gutter, \$2,552 for storm drains.

Frank Gillespie was the low bidder for improving Commonwealth Ave. from Temple St. to Melrose Ave., a distance of 7 blocks, at \$2.50 per lin. ft. for grading and graveling, complete, 36c per lineal ft. for cement curb, 16c per sq. ft. for cement gutter, 30c per sq. ft. for vitrified block gutter, 50c per sq. ft. for granite block gutter, 12c per sq. ft. for sidewalk, \$500 for storm drains and appurtenances, complete.

The lowest bids received for improving Garnet St. from Boyle to the terminus of Garnet St., a distance of 12 blocks, were as follows: H. H. Curtis, \$2 for grading and graveling complete, 8c for regrading, regrading and oiling, 35c for cement curb, 15c for cement gutter, 35c for vitrified block gutter, 11c for sidewalk, \$100 per lin. ft. for culverts, including wings, complete, and Geo. H. Curtis, \$2.20 for grading and graveling, complete; 7c for regrade, gravel and oil; 14c for cement gutter, 35c for vitrified block gutter; 11c for sidewalk; \$15.00 for storm-drains and appurtenances, complete; 30c. for cement curb.

Benj. F. Ford was the low bidder for improving Maple Ave. from Seventh St. to Washington St., a distance of 12 miles, at 18c for asphalt paving, \$950 reinforced concrete culvert at Tenth St.; \$320 reinforced concrete culvert at Twelfth St.; \$397 reinforced concrete culvert at 15th St.; 33c for cement curb; \$497 reinforced concrete culvert at 15th St.; reinforced concrete culvert at 16th St.; 30c. for vitrified block gutter; 40c. for granite block gutter; \$497 reinforced concrete culvert 16th St.

The lowest bids for improving 38th St. from Central Ave. to the east city limits, a distance of 10 blocks, were Benj. F. Ford, 18c for asphalt paving, 33c for cement curb, 40c. granite block gutter, 11c. for sidewalk, \$1,850 for culverts The Fairchild-Gilmore-Wilton Co., 18.4c; paving, 33c. curb 42c. granite gutter 12c.; sidewalk, \$1,200 culverts.

The Barber Asphalt Paving Co. was the low bidder for improving Stephenson Ave. between Chicago St. and the city limits, a distance of 22 blocks, at 17c for asphalt paving, 37½c cement curb, 26c vitrified block gutter, and \$1,995 for catch basins, culverts and vitrified pipe drains.

The contract for improving Macy St. from North Main St. to the Los Angeles

River, has been awarded to the Barber Asphalt Paving Co., at 16.2-10c per sq. ft. for asphalt paving, 26 1-0c per sq. ft. for brick paving, 43.6-10c per sq. ft. for granite block paving, 35c per lin. ft. for cement curb, 16.4-10c per sq. ft. for asphalt walk, 42.4-10c per sq. ft. for granite block gutter, 11c per sq. ft. for cement sidewalk, \$792.00 for culverts, including wings, complete, west side Alameda St.; \$2,300 for storm drains and appurtenances, complete, as per plan No. 26,097; \$866 for culvert completed, east side Alameda St.; aggregate, \$30,421.42.

The following bids were received Sept. 16, by the Bd. of Spvs. for the improvement of a portion of Huntington Drive; P. A. and C. H. Howard, bid, (a) 50c per cu. yd. for 2,800 cu. yds. of excavating; (b) 9c per lin. ft. for 12,645 lin. ft. of snapping road bed; (c) 48.9c per cu. yd. for 23,000 sq. yds. of concrete pavement with bituminous wearing surface; (d) \$9.00 per cu. yd. for 23.3 cu. yds. of class A concrete; (e) 4c per lb. for 1,004 lbs. of reinforcing steel; (f) 75c per lin. ft. for 110 lin. ft. of 12-in. reinforced pipe; J. M. Montgomery bid, (a) 35c, (b) 20c, (c) 62.7c, (d) \$13.00, (e) 5c, (f) \$1.75; Conner Contr. Co. bid, (a) 75c, (b) 5c, (c) 63c, (d) \$13.05, (e) 5c, (f) \$1.25. F. F. Prendergast bid, (a) 50c, (b) 10c, (c) 65c, (d) \$16.00, (e) 5c, (f) \$1.25. Hudson Johnson Const. Co. bid, (a) 25c, (b) 3c, (c) 73c, (d) \$13.00, (e) 5c, (f) \$1.50. Gailey and Clark bid, (a) 45c, (b) 30c, (c) 49c, (d) \$15.00, (e) 5c, (f) \$1.60. Walter Overell bid, (a) 40c, (b) 12½c, (c) 64c, (d) \$7.45, (e) 10c, (f) \$1.00. All bids were referred to the Highway Commission.

The contract for improving Albany St. from Ninth St. to Tenth St. has been awarded to Fairchild-Gilmore-Wilton Company, at 17c per sq. ft. for asphalt paving, 28c per sq. ft. for vitrified block gutter; aggregate, \$3,952.02.

The contract for improving Menlo Ave. from 100 feet South of Thirty-ninth St. to 50 ft. North of Leighton Ave., has been awarded to Fairchild-Gilmore-Wilton Company, at 17½c per sq. ft. for asphalt paving, 30c per lin. ft. for cement curb, 30c per sq. ft. for vitrified block gutter, 12c. per sq. ft. for sidewalk; aggregate, \$4,365.

The contract for improving Torrence St. from Hobart Bvd. to Western Ave., has been awarded to Geo. E. Spain, at \$1.80 per lin. ft. for grading and graveling, completed, 35c per lin. ft. for cement curb, 16c per sq. ft. for cement gutter, 35c per sq. ft. for vitrified block gutter, 11½c per sq. ft. for sidewalk; aggregate, \$3,559.66.

Mered, Cal.—The Ransome-Crummey Co. was awarded the contract for paving 11 blocks along 16th St. The bid was 13c. per sq. ft. for 4 or 5-in. base and 35c per lin. ft. for concrete curb. Thompson Bros. of Fresno bid 13½c per sq. ft. for paving and 40c for curb. The Worswick Street Paving Co. bid 14c for 4-in. base, 15c for 5-in. base and 48c for curb.

Pasadena, Cal.—The Baldwin Const. Co. was the low bidder for improving Hill Ave. at 30c per lin. ft. for regrading, 85c for grading, 26c for curb, 14c for gutter, 4.89c per sq. ft. for oiling; total, \$23,792.40. W. A. Dantanville bid 28c for regrading, 78c for grading, 26c for curb 11c for gutter, 5½c for oiling; total, \$25,667.83.

San Diego, Ca.—The following bids were received by the City for the improvement of Fourth St. between Ivy St. and University Ave., a distance of 20 city blocks; Barber Asphalt Paving Co., 17.8c. per sq. ft. for asphalt paving; 40c per lin. ft. for cement curb; \$2.65 per lin. ft. for culverts. The Fairchild-Gilmore-Wilton Co. bid 17.4c, 35c and \$2.

John Engebretson was awarded the contract for grading Mississippi Ave. from University to El Cajon Ave., at \$1.75 per lin. ft.; total, \$7,067.41.

Ford and Stout, Bradbury Bldg., Los Angeles, have acquired a site bounded by California, Cedar, Arctic Sts., on which they will construct an asphalt plant, to be used in connection with the paving of India St., the contract of which was awarded to them at \$95,000.

Centralia, Ill.—The contract for the Fourth Ward paving was let by the Bd. of Loc. Imps. to Hoffman Bros., at \$53.75.

Evansville, Ind.—The Co. Cmrs. of Vanderburg Co. let the contract for the St. Joseph Ave. road, on the line between German and Center Twp., to Cousin & Anselme, for \$8,675.

Gary, Ind.—The contract for the improvement of West Fifth Ave., from Clark road to the west city limits, was let to the Cain Constr. Co. at \$19,931.85.

Shreveport, La.—The contract to build the first part of the proposed Hart's Island and Red River road was given R. E. Shisler for \$22,000.

St. Louis, Mo.—The contract for the paving of Alaska St. between Bates and Itaska Sts. has been awarded to the Evermann Constr. Co., at \$21,063.90.

The contract for paving Ninth St., from Barton to Park Sts., has been awarded to Skralinka Constr. Co., at \$36,451.58.

Bentley, Neb.—The lowest bid submitted for the repaving of District No. 1 was \$2.07 per sq. yd. for vitrified brick with asphalt filler, and \$1.93 per sq. yd. for sand filler, submitted by Able & Roberts, of Lincoln.

Alliance, O.—The contract for the paving of Vine St. was let to J. C. DeVine Co., its bid being \$20,022. The specifications call for Alliance Brick Company's bricks, stone curbs, cement fillers and slag base.

Columbus, O.—The contract for grading and paving with waterbound macadam Section No. 2 of the New Jasper Station Road, in Jasper Twp., Greene Co., length, 1,800 ft., width, 12 ft., has been awarded to the Wilson Engr. & Constr. Co., of Xenia, at \$1,164.

The contract for grading and paving with brick for light traffic the Steubenville and Canton Road in Center Twp., Carroll Co., length, 7,025 ft., width, 14 ft., has been awarded to S. W. Hart & Son, of Minerva, at \$22,993.50.

The contract for grading and paving with brick for light traffic the Petersburg Road in Center and Union Twp., Carroll Co., length, 5,500 ft., width, 14 ft., has been awarded to S. W. Hart & Son, of Minerva, at \$17,643.25.

The contract for grading and paving with a waterbound gravel macadam the Columbus Road in Xenia Twp., Greene Co., length, 14,588 ft., width, 14 ft., has been awarded to The Wilson Engrg. & Contr. Co., of Xenia, at \$9,216.

Dayton, O.—The contract for paving Carlisle Ave., between Wyoming and Wayne Sts., has been awarded to J. O. Shoup, at \$14,516.

Marion, O.—The contract for resurfacing Prospect St., paving Lincoln Ave. and constructing a sewer on Bernhardt Ave. has been awarded to the Asphalt Block Co., of Toledo; the bid for the work complete being \$16,756.85.

Springfield, O.—The following contracts have been awarded for street work: Macadamizing Sigler St., Edward Ryan, \$6,312.04; macadamizing Jasper St., Thomas E. Wren, \$1,156.72; macadamizing Mulberry St., Thomas E. Wren, \$2,766.07; macadamizing Innisfallen Ave., Thomas E. Wren, \$2,826.26; macadamizing Cecil St., Thomas E. Wren, \$2,054.99; macadamizing Grand Ave., Thomas E. Wren, \$4,257.18.

Toledo, O.—A contract has been awarded by the Bd. of Control for the paving of Albion St. from Monroe to Central Ave., with vitrified brick with an asphalt filler on a concrete foundation, at \$35,512.24.

Philadelphia, Pa.—The contract for the repaving of a section of Broad St., between Cumberland St. and Lehigh Ave., with redressed granite blocks has been awarded to Joseph McHugh.

A contract has been awarded for the repaving of the asphalt pavement on non-traction streets to the Union Paving Co., at about \$140,000.

Taylor, Tex.—The contract for paving the main business streets of Taylor has been awarded by the City Council to Ockander Bros., of Waco. Material to be used is creosoted block on a concrete base. Approximate cost, \$75,000.

BIDS ASKED AND PROSPECTIVE WORK

Santa Ana, Cal.—The Co. Bd. of Spvs. of Orange Co. will receive bids up to Oct. 2, for the construction of a reinforced concrete bridge across Trabucca Creek.

Santa Barbara, Cal.—Sealed bids will be received by the Bd. of Spvs. of Santa Barbara Co. until 10 a. m., Oct. 7, 1912, for furnishing all labor and material necessary for building a bridge across the Tecolotito Creek on Holland Ave.

Stockton, Cal.—Sealed bids will be received by the Clerk of the Bd. of Spvs. of San Joaquin Co., at the office of said Bd., until 10 a. m., Oct. 3, 1912, for the construction of Garwood bridge. Eugene D. Graham is Clerk.

Plymouth, Ind.—Bids will be received Oct. 8 for the construction of the following items of bridge work in Marshall Co.: Superstructure Drake bridge in Polk Twp.; superstructure Sarber bridge in Olk Twp. The plans and specifications are on file in the office of George D. McCoy, Aud. Marshall Co.

Muscataine, Ia.—An agreement has been made between the members of the Muscatine City Council and the officials of the

Devenport & Muscatine Interurban Co., by which the City will erect a new bridge on Issett Ave. The cost will be about \$5,400. The new bridge will be of reinforced concrete, 30 ft. long and 50 ft. wide.

Leavenworth, Kan.—Sealed proposals will be received at the office of the Co. Clerk of Leavenworth Co. up to noon, of Monday, Oct. 7, 1912, for the construction and repair of the following bridges: Repairs to Mud Creek bridge in Reno Twp.; repairs to the Harris bridge, between Linwood and Lenape, in Sherman Twp.; repairs to Pickens bridge on Pickens farm in Sherman Twp.; construction of new concrete bridge on the line between Leavenworth and Wyandotte Cos., near the Russell farm; construction of new concrete and steel bridge on Kansas City Road, near the Ben Piper farm; construction of new bridge between Ackerland and Springdale on Fall Creek; construction of new concrete arch on East and West road, one mile south of High Prairie school house, in High Prairie Twp. near Seifert farm; construction of concrete arch on Burke road near the Kenton farm in Fairmount Twp., according to plans and specifications of the Co. Eng. J. A. Hall is Co. Clerk.

Grand Rapids, Mich.—At the November election the question of constructing a concrete bridge at Pearl St. will be decided. Address Mayor Ellis.

Newark, N. J.—Bids will be received Oct. 1 for the construction of a highway bridge over the Turnpike River, on the Belleville Tpke., between the town of Belleville, and the town of Kearny, and the erection and maintenance of a temporary bridge pending the construction and completion of the permanent bridge. Address Harry C. Jaeger, Chmn.

Buffalo, N. Y.—The Grade Crossing Comrs. have unanimously adopted the general plan of grade crossing elimination which has been under discussion at public hearings for several weeks. Maurice C. Patch is Chmn.

Cincinnati, O.—Bids will be received Oct. 4 for the building of culverts on the road between the lands of Woltering and Black, and for repairs of bridges on the Cleves and Miamitown road in White-water Twp. Address Stanley Struble, Pres. Br. Loc. Imps.

County Surveyor Cowen, of Hamilton Co., is preparing plans for a concrete bridge to replace the old structure over Mill Creek, on the Clark Road, near Lockland, which recently collapsed. The new bridge will cost \$10,000.

Lima, O.—Bids will be received Oct. 15 for performing the labor and furnishing the material necessary for the erection and completion of the Third St. Concrete arch, N. 25,191, in Delphos, O., over Flat Fork St. Address C. R. Phillips, Clerk of the Bd.

Urbana, O.—The Champaign Co. Comrs. have directed plans to be prepared for two bridges. Address Co. Surv. at Urbana.

Hobart, Okla.—The Jackson Co. Comrs. have decided to construct a bridge across the north fork of the Red River, between Snyder and Headrick. Estimated cost, \$7,000.

York, Pa.—Plans are being developed for the erection of a bridge of modern architectural design to replace the present inadequate structure across the Codorus Creek. Address William A. Fry.

Fort Worth, Tex.—Bids will be received Oct. 23 for the erection of a concrete bridge to cost \$300,000, and to span North Main St. Engineers Brenneke and Foy have prepared plans. Address A. J. Beavers, Co. Clerk.

Appomattox, Va.—Sealed bids will be received at Appomattox until noon, Sept. 30, 1912, for the construction of a bridge over Wreck Island Creek, Appomattox Co., near Spout's Spring; approximate length, 41 ft., 12-ft. roadway, character of superstructure, steel beam span; character of substructure, plain concrete. Plans and specifications can be seen at the office of the Clerk of the Circuit Court at West Appomattox, or at the office of the State Highway Engr. at Richmond.

Sealed bids will be received at Powhatan Court House, Va., until noon, Oct. 3, for the construction of a bridge over the James River, between Coochland and Powhatan Counties, near Maidens; approximate length, 1,009 ft. 6 in., with a 16-ft. roadway, character of superstructure, steel; character of substructure, concrete. Plans and specifications are at the office of the Co. Clerk of Powhatan Co., or at the office of the State Highway Comr. at Richmond. P. St. Julien Wilson is State Highway Comr.

Richmond, Va.—Sealed bids will be received by P. St. Julien Wilson, at the office of the Clerk of the Circuit Court of Alleghany Co., at Covington, until noon, Oct. 5, for the construction of a bridge over Dunlaps Creek, near Callaghan; length, 87 ft. 6 in., with 12-ft. roadway. Character of superstructure, one standard steel span, 87 ft. 6 in. Character of substructure, concrete. Plans and specifications at the office of the clerk of the Circuit Court, or at the office of the State Highway Commissioner at Richmond.

Sealed bids will be received by P. St. Julien Wilson, State Highway Comr. of Virginia, at the office of the Clerk of the Circuit Court of Patrick Co., Stuart, until noon, Oct. 8, for the construction of a bridge over the Mayo River, near Stuart. Approximate length, 100 ft., 16-ft. roadway; character of superstructure, 100-ft. steel span; character of substructure, two concrete abutments. Plans and specifications at the office of the clerk of the Circuit Court, or the State Highway Comr. at Richmond.

Bids Received and Contracts Awarded.

Macomb, Ill.—The contract for the erection of a bridge over Camp Creek has been awarded to Geo. A. Quinlan, of Chicago, at \$3,027.

Woodbury, N. J.—The following bids have been received for the construction of a new bridge over Mantua Creek, at Paulsboro: Bridgeton Constr. Co., \$26,827, and \$2,100 extra for building a temporary structure; Owego Bridge Co., \$22,250, and \$2,600; F. R. Long, \$27,528, and \$2,900; National Bridge Co., \$28,776, and \$3,300.

BONDS.

Lackawanna, N. Y.—Bids will be received Oct. 7 for the purchase of \$30,000, 4½% street improvement bonds. Address City Clerk.

Dayton, O.—Sealed proposals will be received at the office of the City Aud. until noon, Oct. 7, 1912, for the sale of the bonds of the said City in the amount of \$15,200.00, for the purpose of providing addition to a bridge at Keowee St. Geo. W. Bish is Aud.

Bids will be received Oct. 26 for the purchase of \$15,000 bridge bonds. Address J. O. Donovan, Sec'y.

Pearson, Tex.—An election will be held December 7 to decide the question of issuing \$80,000 road bonds. Address Co. Judge.

Smithville, Tex.—Bids will be received Oct. 14 for the purchase of \$100,000 good road bonds. Address City Clerk.

MISCELLANEOUS.

Chico, Cal.—The City will invest in an asphalt plant before further paving is undertaken on the streets in the residence district.

Fresno, Cal.—Bids will be received up to Oct. 7, by the Bd. of Trustees for furnishing a road oiling machine. W. H. Ryan, City Clerk.

Tampa, Fla.—Sealed bids will be received at the office of the Bd. of Comrs. of Pub. Works of the City of Tampa, until 2 p. m., Oct. 1, 1912, for 20,000 lin. ft. of granite curbing and 140 corners of 6-ft. radius, inspection in Tampa, delivery to begin thirty days from date of signing contract, not less than 5,000 feet to be delivered monthly. Specifications can be obtained by applying to the City Engr. D. B. McKay is Chmn.

Covington, Ky.—The Council is planning to eliminate grade crossings at a cost of \$800,000. Address City Surv.

Cleveland, O.—Bids will be received Oct. 2 for asphalt cement for the Street Repair Dept. Address W. J. Springborn, director of Pub. Service.

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Number
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Roads and Streets In and Near Atlantic City, N. J.

Atlantic City, where the first joint congress of the American Association for Highway Improvement, the American Automobile Association, the National Association of Road Machinery and Material Manufacturers and thirty-six associated organizations was held, is situated on a small island on the ocean front near the southern extremity of the state of New Jersey. It is 56 miles southeast by rail from Philadelphia, Pa., and something over 140 miles south of New York City. The island on which Atlantic City is located is about seven miles long and two miles wide. It is separated from the mainland by a channel known as Beach Thoroughfare, and five miles of marsh and meadows. Besides Atlantic City the island comprises Ventnor, Margate City and Longport Borough.

It is accessible by rail and sea, two railroad lines, the Pennsylvania and the Atlantic City Railroad, a division of the Pennsylvania and Reading Railroad approaching it from Philadelphia, and a line of passenger steamers and one of freight running from New York City. The Penn-

sylvania road has both steam and electric service from Philadelphia, and several suburban electric rapid transit lines run out from Atlantic City to Ocean City, Summers Point, Absecon and other beach resorts.

The city is essentially a pleasure resort, its principal industry being the entertainment of visitors to its beaches. The permanent population, according to the census of 1910, was 46,150, and is estimated at present to be approximately 50,000. The average population, including both resident and transient, is about 90,000. There are, however, at times as many as 300,000 people in the city.

A complete revolution of the form of government took place in July of this year when the old city government, consisting of mayor, city council, etc., was supplanted by the commission form of government, comprising five commissioners, each in charge of a division of the city work. The divisions and directors in charge of them are as follows: Streets and Public Improvements, J. B. Thompson; Public Affairs, Wm. Riddle; Parks and Public Prop-



YOUNG'S MILLION DOLLAR PIER AT ATLANTIC CITY, N. J.—MEETING PLACE OF THE AMERICAN ROAD CONGRESS.



STATES AVE., ATLANTIC CITY, PAVED WITH VITRIFIED BLOCK IN 1908-1909.



TENNESSEE AVE., ONE OF TWO BLOCKS IN ATLANTIC CITY PAVED WITH WOOD BLOCK, LAID IN 1907.

erty, Harry Bacharach; Finance, Albert Beyer; Public Safety, Wm. H. Bartlett. These five men comprise what is known as the Board of Directors.

The supervision of streets is in charge of John W. Hackney, City Engineer. Mr. Hackney was appointed city engineer late in August of the present year, having held that position for ten years previous to 1909.

The city has an area of 3,066 acres, and has 58 miles of streets, all running east and west, north and south. There are no oblique or diagonal streets in the city. It is unique among the cities of the country in that it has practically no mileage of unimproved streets, the soil being of such a sandy character as to prohibit traffic without some form of surfacing. What might be termed the lowest grade of improved roads is of the gravel type, of which there are about 18 miles in the city. The rest of the streets are of asphalt, bitulithic, wood block, vitrified

brick, telford and macadam. At the beginning of the present year the mileage of each class of pavement was as follows: Macadam, 18.4 miles; telford, 2 miles; vitrified brick, 6.6 miles; bitulithic, 10.4 miles; asphalt, 2.6 miles; wood block, .4 miles; gravel, 18 miles; total, 58.4 miles. Since the first of the current year, three contracts for asphalt paving have been awarded and the work completed. These streets are Oriental Ave., between New Hampshire and New Jersey Avenues, five blocks; Massachusetts Ave., between Atlantic Ave. and the Boardwalk, three blocks, and Metropolitan Ave., between Oriental Ave. and the Boardwalk, one block.

The principal business street of the city, outside of the famous Boardwalk, which will be described later, is Atlantic Ave., running east and west the entire length of the city, about $3\frac{1}{2}$ miles. This street is paved with bitulithic. The work was done in 1907 by the Standard Bitulithic



ORIENTAL AVENUE, ATLANTIC CITY, LOOKING SOUTH TOWARD THE BOARDWALK—PAVED WITH SHEET ASPHALT WITH TEXACO PAVING CEMENT.



ATLANTIC AVE., ATLANTIC CITY, N. J., PAVED WITH BITULITHIC IN 1907.



AMIESITE PAVEMENT LAID THIS YEAR ON SHORE ROAD NEAR ATLANTIC CITY, N. J.

Co., and consists of three inches of bitulithic surface on a concrete foundation. The contract price was \$2.25 per sq. yd., subject to a 10-year maintenance clause.

The principal residential street is Pacific Ave., also running east and west, paralleling Atlantic Ave. one block south. About 2 miles were surfaced with asphalt in 1906. The street is 60 ft. wide, with a 34-ft. roadway and 13-ft. sidewalks on each side.

The sidewalks of Atlantic City are practically all of cement. The curbs that are being laid at present are granite, 5 ins. wide by 18 ins. deep, except in the case of one or two of the heavily traveled streets where the blocks are 6 ins. wide. Formerly 4-in. blue stone blocks were used and there is still a considerable amount of this type of curb in use. Gutters are universally of vitrified brick, usually 3 ft. wide, although in some streets they are wider.

By far the most important thoroughfare from every

standpoint is the Boardwalk, which extends along the ocean front $4\frac{1}{2}$ miles in Atlantic City proper and 8 miles altogether, extending practically the full length of the island except for one or two short intervals. The present structure was built in 1896 and extended in 1897, 1898, 1899 and 1905. It is from 40 to 60 ft. wide and 12 ft. high. It is constructed of $1\frac{1}{2}$ -in. hard pine plank, 9 ins. wide, laid on heavy timbers which in turn rest on wood piles. It was built by the city, and altogether cost over \$475,000. Most of the important stores of the city are on the Boardwalk, and numbers of hotels ranging in size from modest inns to palatial structures like the Marlborough-Blenheim, the Chalfonte and the Traymore face it.

On the beach side of the Boardwalk pavilions and pleasure piers extend out over the beach and sea, some of them for several hundred feet. In one of these, Young's Million Dollar Pier, the road congress will be held.



BOARDWALK AND OCEAN FRONT—A TYPICAL SCENE IN ATLANTIC CITY, N. J., WHERE THE AMERICAN ROAD CONGRESS WAS HELD.



MEADOW BOULEVARD, NEAR ATLANTIC CITY—PAVED WITH WARRENITE THIS YEAR.

This structure extends out over the ocean a distance of 1,800 ft. The auditorium, at the entrance, is 153 ft. wide and 275 ft. long.

The exhibit of machinery and materials and the exhibits of the various states will be held in a building in the southern wing of the pier, known as Machinery Hall, which was constructed for exposition purposes, and was specially built to sustain the weight of heavy machinery. The exhibition space comprises 60,000 sq. ft.

The entire structure is built of concrete, and is declared to be fireproof. Architecturally the pier is designed to be one of the show places of the city and is practically copied from the King's palace in Salamanca, Spain.

The records in the city comptroller's office show that during the 13 years, beginning Jan. 1, 1898, and ending Dec. 31, 1911, \$1,873,220.78 was expended in street paving in the city.

During 1898 the roadway of Pacific Ave. was paved with macadam, and vitrified brick gutters were installed. The work comprised 34,590 sq. yds. of macadam and 18,750 sq. yds. of brick. The cost for macadam was 62 cts. per sq. yd. and the cost of the brick gutters was \$1.75. The total cost was \$69,550.78. The contract was dated Oct. 7, 1898, and the work was finished in the following July. The Delaware Quarry & Construction Co. did the work.

In January, 1899, a contract was awarded to Turner & Moore for laying macadam pavement and constructing brick gutters on Delaware and North Carolina Avenues and



SECTION OF WARRENITE PAVEMENT LAID THIS YEAR ON MEADOW BOULEVARD, ATLANTIC CITY.

other streets at a total cost of \$30,344.83. The contract price for the macadam was 72 cts. per sq. yd. and the brick \$2.20. The work was finished in July of 1899. Arctic Ave. and a portion of South Carolina Ave. were also macadamized and provided with brick gutters in the same year by James B. Reilly, at a total cost of \$104,820.04, the contract price for macadam being 59½ cts. per sq. yd. and brick \$1.86.

Macadam pavement and brick gutters were installed in portions of South Carolina and Delaware Avenues in 1900 by the Delaware River Quarry & Construction Co. at a cost of \$16,662.03.

In 1901, 66,854 sq. yds. of macadam and 30,283 yds. of brick gutters were constructed in Arctic, South Carolina and Rhode Island Avenues and other streets by McAvoy, Murray & Cunningham. The total cost of this improvement was \$137,900.48. The contract price for macadam was 50 cts. per yard and the brick \$2.05.

The following year the first pavement of a material other than macadam was constructed, 8,680 sq. yds. of vitrified brick pavement being laid on Westminster and other avenues by Wm. B. Dixey, at a total cost of \$30,732.05. The price per sq. yd. for the brick surfacing was \$1.95. The work was finished in July, 1903. In December of the following year, contracts were awarded for about



WARRENITE PAVEMENT ON MEADOW BOULEVARD, NEAR ATLANTIC CITY—SURFACE LAID THIS YEAR.

100,000 sq. yds. of macadam paving and something over 50,000 sq. yds. of brick gutters on Caspian and other avenues, the work being done by the Delaware River Quarry & Construction Co., at a total cost of \$226,296.81. The price per sq. yd. for macadam was 47 cts. and for the brick \$1.97. The work was not finished until Oct. 11, 1905. No further contracts were awarded until April 5, 1905, when granite curbing was installed on Atlantic Ave. by Edward Moss and B. W. Walters, at a total cost of \$43,519.18. The work was finished in August, 1906.

During the same month a contract for the first asphalt paving was awarded to the Cleveland Trinidad Paving Co. The work consisted of surfacing a section of Pacific Ave. with sheet asphalt and repairing gutters. The asphalt paving cost \$1.49 per yard, the total cost being \$49,978.28.

On September 14, 1906, the contract for the only wood block paving which has been constructed in Atlantic City was awarded to the U. S. Wood Preserving Co. The work was done on Tennessee and Mansion Avenues, one block on each. In this work 3,767 sq. yds. of pavement were laid at a total cost of \$14,640.07, the contract price per yard being \$3.29.

On Oct. 8, 1906, the Standard Bitulithic Co. was awarded a contract for paving Atlantic Ave. with bitulithic and

constructing brick gutters. The work consisted of 95,769 sq. yds. of bitulithic and 12,751 sq. yds. of brick at \$2.25 and \$2.55 per sq. yd. respectively. The total cost of this contract to the city was \$288,246.18. On Oct. 29, of the same year, terra cotta and cast iron drains were constructed in Atlantic Ave. by Callery & Murphy and Russell Co. at a total cost of \$26,785.69. This is the only example of this class of drains in the city.

Two years later, in 1908, another section of Pacific Ave. was paved with sheet asphalt and the gutters repaired by the Warner-Quinlan Asphalt Co., the contract price for asphalt being \$2.23 per yd. The work comprised 23,203 sq. yds., altogether, and cost \$67,779.94.

On Feb. 21, 1908, a contract was awarded to the H. G. Mulock Co. for building macadam and telford pavements and brick gutters on Chelton and other avenues at a total cost of \$19,798.85. The following April the Standard Bitulithic Co. received the contract for paving Virginia and South Carolina Avenues with bitulithic, and reconstructing brick gutters. The contract called for the laying of 9,135 sq. yds. of bitulithic and the price was \$2.55 per sq. yd. The total cost to the city was \$28,050. On Aug. 17 of the same year the contract was awarded to B. F. Sweeten & Son for constructing vitrified block pavement on States and other avenues. The work comprised 7,221 sq. yds. and the contract price was \$2.18 per yd., the total cost to the city being \$40,309.26.



ATLANTIC AVENUE, ATLANTIC CITY, N. J.—PAVED WITH BITULITHIC IN 1907.

In November of 1908 the contract for laying 6,573 sq. yds. of bitulithic and 844 sq. yds. of block gutters was awarded to the United Paving Co. The contract price was \$1.95 a yard for bitulithic and \$1.75 for block gutters. The same company received the contract in 1909 for a small amount of bitulithic paving on Albany Ave., the total cost being \$3,462.64.

On Feb. 23, 1909, H. G. Mulock Co. was awarded the contract for constructing macadam and telford paving and block gutters in New Hampshire and other avenues, the quantities being as follows: Macadam, 7,680 sq. yds.; telford, 4,818 sq. yds.; block, 10,088 sq. yds. The contract price for macadam was 82 cents. per sq. yd., telford \$1.35, block \$2.10. In June of the same year the contract for constructing 51,715 sq. yds. of bitulithic, 2,907 yds. of telford, 2,347 sq. yds. of macadam and 5,559 sq. yds. of block paving on Irving and other avenues was awarded the United Paving Co., at \$2.55 per yard for bitulithic, \$1.48 for telford, 95 cts. for macadam and \$2.33 for block. The total cost to the city was \$155,706.98.

On March 29, 1910, one contract was awarded for constructing macadam and block gutters on Hummock and



ATLANTIC AVE., MARGATE CITY, N. J.—WARRENITE PAVEMENT ON LEFT, UNIMPROVED ROADWAY ON RIGHT.

other avenues, one for constructing bitulithic and block gutters on Maryland Ave. and one for constructing bitulithic paving and shale block gutters on Victoria and other avenues. Edward L. Bader was awarded the contract for the Hummock Ave. job at 71 cts. per sq. yd. for macadam and \$2.08 for block gutters, the total cost being \$34,700.01. The same contractor secured the work on Maryland Ave. at \$1.95 per sq. yd. for bitulithic, the total cost to the city being \$32,094.16. The United Paving Co. secured the contract for the bitulithic paving on Victoria and other avenues, the contract price for bitulithic being \$2.55 per sq. yd. and for block \$2.38 per sq. yd. The total cost was \$67,375. In June of the same year the contract for bitulithic pavement and shale block gutters on Connecticut and other avenues was awarded to the United Paving Co. at \$64,878.28. The work comprised 15,249 sq. yds. of bitulithic and 2,893 sq. yds. of block, the contract price being \$2.62 per yard for bitulithic and \$2.55 for block.

In November of 1910 the contract for constructing 1,839 sq. yds. of fire clay brick paving on Arkansas Ave. was awarded to the United Paving Co. at \$2.54 per sq. yd., the total cost being \$5,967.50.

In 1911, 12,620 sq. yds. of bitulithic and 966 sq. yds. of block gutter were constructed in Albany Ave. by the United Paving Co., the contract price for bitulithic being \$2.62 per yard and for block \$2.57 per yard. The total cost to the city for this contract was \$73,022.10.



LAYING AMIESITE PAVEMENT ON SHORE ROAD NEAR ATLANTIC CITY, N. J.

During 1912 several contracts have been awarded and about 50 sets of specifications for other work have been prepared. Of the contracts awarded one for the construction of three streets has been completed.

The material used in surfacing all three of these streets was Texaco asphalt paving cement. There were 15,000 sq. yds. laid in all, and the work was done by the J. F. Shanley Co., of Newark, N. J. The price was \$1.73 per sq. yd. for 1-in. of binder course and 2-in. wearing surface, and 68 cts. for 4-in. concrete foundation. This price of \$1.73 for the work, complete, included a 5-year guarantee. The work was started June 28 and was completed on August 26. Some delay was incurred on account of the difficulty experienced in obtaining curbing. The plant used on the work was a Conner one-car portable asphalt plant, and was located at Delaware and Mediterranean Aves. The capacity of this plant was 2,000 sq. yds. per day. The average output was 1,000 yds. per day, although it frequently ran higher, and on one occasion 1,900 sq. yds. of binder were laid and 1,500 sq. yds. of surfacing the following day.

The average haul from the plant to the work was $\frac{3}{4}$ mile, and the average cost of hauling was 4 cts. per yard for binder and 6 cts. for top. Close binder was used on all the work with the exception of one square on Oriental Ave., between New Jersey and Connecticut Aves., where an open binder was laid. The inspection of the work for the city was done by Dow & Smith of New York.

The traffic on Oriental and Massachusetts Aves. consists largely of huckster's conveyances, public busses, express wagons, heavy automobile delivery trucks and automobiles. The traffic on Metropolitan Ave. is of the same general character as that on the other two, but not quite so heavy.

Some work has recently been done near Atlantic City, but outside of the city limits. Meadow Boulevard was paved with Warrenite in the early part of 1911. This boulevard is 60 ft. wide and approximately 30,000 sq. yds. of surfacing was laid. The Standard Bitulithic Co. was recently awarded the contract for laying 15,000 sq. yds. or about one mile of bitulithic on Atlantic Ave. in Margate City. The work is now in progress. This street is a continuation of Atlantic Ave., in Atlantic City.

Another stretch of suburban road which is being paved at the present time, is known as the Shore Road, which begins at the bridge at Absecon, and extends to New Jersey Ave., Summer's Point, a distance of 9.25 miles. It is being paved with Amiesite, 30 ft. wide and 6 ins. deep. The contract price was \$196,602.89. The work is being done by James B. Reilly, an Atlantic City contractor.

Effect of Diameter of Bitumen Holder on the Penetration Test*

By CHARLES S. REEVE.†

Since the now generally adopted penetration standards were described by Dow (Proc. Am. Soc. Test. Mat. Vol. III, 1903, p. 349), at least two important factors have been brought to bear upon this test through the use of new and varied forms of bituminous materials. At the time the present standards were proposed, the test was applied almost entirely to paving cements, and the sample was usually contained in a tin box at least $2\frac{1}{2}$ ins. in diameter. A box of this diameter having a depth of 0.8 in. would conveniently hold 50 grams of asphaltic paving cement and give ample depth for a penetration test on such material. And since the above mentioned amount was generally specified for the volatilization test, the sample could be tested in the same container both before and after heating.

*Paper presented at the sixth congress of the International Association for Testing Materials, New York City, Sept. 3-7, 1912.

†Chemist, U. S. Office of Public Roads, Washington, D. C.

The rapid increase in the use of bituminous binders for road construction and maintenance has, however, caused a demand for a great variety of these materials, many of which are too soft to be tested in the shallow standard tin, and the general adoption of a 20-gram sample for the volatilization test (Proc. Am. Soc. Test. Mat. Vol. XI, 1911, p. 248), has, moreover, made it necessary to use some narrower form of container in order to secure a sample of sufficient depth for making a penetration test on the residue. The American Society for Testing Materials recommends (Proc. Am. Soc. Test. Mat. Vol. XI, 1911, p. 247), that, when testing material softer than 100 (hundredths of a centimeter) penetration, a containing receptacle not less than $1\frac{1}{4}$ ins. in diameter shall be used. The American Society of Civil Engineers advises that in obtaining the penetration of the residue from evaporation tests a flat bottomed dish $\frac{3}{8}$ in. in diameter and $1\frac{1}{2}$ ins. high should be used. The author, however, has seen tubes as small as $\frac{1}{2}$ in. in diameter used for these tests in several well regulated laboratories, and had called to his attention one case in which wooden tubes of less than $\frac{1}{4}$ in. diameter were used. The specific recommendations of the societies above mentioned would indicate that the influence of the diameter of the container had been the subject of some study, but since the author knows of no published data on the subject, he offers the following brief but systematic investigation of the matter for consideration.

Containers were made by cutting sections about 25 millimeters in length from standard thin walled brass tubing of 37, 31, 24, 21, 18 and 15.5 millimeters inside diameter. By placing these sections upright in circular tin box lids, a number of cups for holding the bitumen were obtained. For the 45-millimeter size a 50-c. glass beaker was used. At least three and in some cases five containers of each size were filled at the same time with the material to be tested and immersed in water for at least one hour. The water was carefully maintained at a constant temperature of about that of the room at time of testing and ranged from 23°C. to 25°C. The test was made with 100 grams for 5 seconds, using a standard No. 2 needle, which was allowed to penetrate at exactly the center of the sample. Only one test was therefore made in each container, and the results shown are the mean of from three to five single tests for each size. It can be stated that the maximum difference between the extremes of any set of tests was 3 points, excepting in the case of the coal tar pitch, where there was a difference of 6 points between the extremes in testing the 37-mm. and 21-mm. sizes.

RESULTS OF PENETRATIONS IN CUPS OF DIFFERENT DIAMETERS.

Diameter of Cup.	Material.					Water-gas Tar Pitch.	Defective Oil Asphalt.
	Fluxed Bermudez Asphalt.	Oil Asphalts.			Coal Tar Pitch.		
45 mm.	187 73	211 140 118 100	260 85	217 85	...	...	...
37 "	188 73	207 140 118 101	247 84	214 85	176	...	...
31 "	182 72	205 139 117 100	243 84	213 84	...	...	...
24 "	176 72	197 138 115 99	232 83	202 84	...	...	...
21 "	171 70	197 135 113 98	226 81	198 84	...	...	...
18 "	167 68	188 135 112 98	213 77	193 83	...	...	...
14.5 "	162 68	189 133 111 97	209 75	185 81	176	...	...
% decrease	13.8 6.8	10.9 5.0 5.9 4.0	19.6 11.8	14.8 4.7	0.0	...	...

*Between maximum and minimum of series.

Although a few slight discrepancies appear in the above table, they are due to the occasional unavoidable error in making the test, and in most cases would not have appeared had a single particularly high or low figure been omitted in obtaining the average for the test. The general trend of the results, however, shows the unquestionable decrease of the penetration due to diminishing the diameter of the cup. It will be noted, moreover, that the retarding effect on a coal tar pitch of 85 penetration or a fluxed Bermudez asphalt of 188 penetration is greater than

on a soft oil asphalt of 211 penetration; that it is greater on a fluxed Bermudez asphalt of 73 penetration than on the oil asphalts of 100, 118 or 140 penetration. In other words, from the brief series of tests it has been possible to make in preparation for this paper, it would appear that those materials which Dow has classed (Proc. Am. Soc. Test. Mat. Vol. VI, 1906, p. 497), as being composed principally of fluids of high surface tension are most susceptible to the influences of varying the diameter of the bitumen holder used in making the penetration test. The varying results on different materials as above noted are probably to be explained by differences in the surface tensions of the several types, coupled with the stronger adherence to the needle of those most affected. A point of interest is that on all but the smallest size a few penetrations were made at a point about midway between the center and edge of the sample, but the results showed no difference from that obtained at the center of the same container.

An interesting development of this work is shown in the column under "Defective Oil Asphalt." This material was the product of a responsible manufacturer and was used for comparison with several other binders in the construction of some experimental sections. The section constructed with this material went to pieces almost immediately, and a thorough investigation of the case brought out a frank admission on the part of those furnishing the material that they had discovered where a serious error had been made in the preparation of a lot of binder of which this was a portion. A sample of this material was the only one which I could find which showed the same penetration in either a large or small container.

Aside from the interesting differences in bituminous materials which are shown from the above results, the necessity for some definite agreement on the size of cup to be used is apparent if specifications are to be rigidly interpreted. Since the penetration test is purely arbitrary, it makes little difference what size container is used so long as the size is understood and adopted generally. The container for residues is, of course, limited in size by the amount of material prescribed for the volatilization test, 20 grams, and for these residues it will hardly be possible to adopt a diameter larger than 25 millimeters if a sufficient depth of sample for making the test is to be always assured, and the author would recommend a container of that size for general adoption.

It is the author's intention to continue work on coal tar pitches and softer fluxed native asphalts, to determine just how large the receptacle must be to become ineffective upon the results, but for the present it would appear inadvisable to use a cup smaller than 50 mm. in diameter for penetration tests and especially for tests on the susceptibility to changes in temperature.

Good Roads Day at Elk City, Oklahoma

By ALVIN T. STEINEL.*

Labor Day at Elk City, Okla., was a day of labor in fact. The citizens of this western Oklahoma town turned out to a man, and worked the country roads for miles in all directions. All business establishments, even the barber shops, were closed, and merchants, bankers, ministers and mechanics put in from ten to twelve hours with pick, shovel, scythe or driving teams and scrapers.

Elk City recently discovered that its farm trade was slipping away. The farmers declared they had better roads to smaller neighboring towns, and that, if Elk City wanted to retain their trade, the roads would have to be improved. The merchants have been making an annual contribution for road work to the township trustees, in



VOLUNTEER ROAD WORKERS CUTTING BRUSH FROM HIGH CENTERS BETWEEN ROADWAYS, ELK CITY, OKLAHOMA.

addition to their regular taxes, but somehow the roads did not show results. When the farmers threatened to turn elsewhere for trading the people of Elk City became aroused. A good roads mass meeting was called by the Chamber of Commerce. While the problem was under discussion the argument was advanced that the farmers themselves were negligent in failing to work the roads bordering their farms. Some one then advanced this plan:

"Let's set aside a good roads day and all of us get out and do some actual work on the roads, getting as many farmers to join us as possible. This will bring each of us to realize the need of permanent road improvement, bring the town and the country people closer together, and result in the establishment of good will, in addition to actual benefit to the roads."

This met with a hearty response and Labor Day was selected as "good roads day" for Elk City. Committees mapped detailed plans and the farmers readily consented to help. At five o'clock on the morning of September 2d the siren fire whistle at the city electric lighting plant blew a five-minute blast that awoke the 3,500 inhabitants of the town and all the farmers within a radius of from six to eight miles, for in this clear western atmosphere sound carries long distances. Before the sun was an hour high twenty automobiles and as many vehicles of other kinds were in service and gangs were sent out over the eight roads selected for work. The original plan was to work each of the eight roads a distance of five miles, cutting weeds, brush and smoothing all rough places, but so many men reported for work that some of the highways were worked a distance of ten or twelve miles out. The workers



GROUP OF SHOVELERS READY TO START WORK—GOOD ROADS DAY AT ELK CITY, OKLA.

*Editor, "The Southwest Trail," Chicago, Ill.

were divided into eight main gangs, with a superintendent in charge of each, and foremen as bosses of subdivisions. More than 500 men and boys were at work before eight o'clock.

The women also did their share, by furnishing dinner for the road workers. Meal camps were established at convenient points, farm houses being used as cooking stations, and town and farm women aided in preparing the meals. "Chuck" wagons started out from town as soon as the road gangs had been placed, these vehicles carrying food and ice. There was plenty of ice water, 1,000 pounds of ice being allotted to each road, and the workers appreciated this, for the sun is hot in western Oklahoma. Being in the heart of the melon country, the farmers contributed liberally of watermelons and canteloupes, so that no road worker could complain of thirst.

The list of superintendents, who themselves took a hand with pick and shovel when necessary, included the following: W. O. Harr, President of the Cotton Exchange Bank; Alfred Taylor, President of the German State Bank; F. E. Herring, general merchant; George F. Sisson, lumberman; J. N. Cook, real estate dealer; Robert Keene, merchant; Robert Thurman, Cashier of the First National Bank; J. A. Yarbrough, real estate dealer; J. A. Bowen, Editor of the "Beckham County News," and H. C. Powell, President of the Chamber of Commerce. The executive committee of ladies in charge of meal arrangements included Mesdames F. E. Herring, D. A. Mayer, J. A. Yarbrough, G. F. Sisson, J. T. Burnett, C. W. Tedrowe, O. H. Cafke and H. O. Hixon. Class distinction, if it exists at all in Elk City, was, for the time being erased, day laborer

working shoulder to shoulder with capitalist and banker for the common good.

The soil in the Elk City neighborhood is a disintegrated sandstone, varying from a brick red to a dark chocolate color. Roads receiving no attention wear down quickly into deep ruts with many sandy spots that often grow to deep drifts under the influence of the winds. The roadways are generally from 40 to 60 ft. wide, with double wheel tracks, wearing down the sides, leaving raised centers that soon are covered with weeds or scrub oak. The wagon tracks then become drains, for every summer shower wears the ruts into veritable gullies that make driving difficult, if not dangerous. In some spots the overgrown centers were found by the road workers to be fully 3 ft. higher than the roadways. Here there was real work to do, axe gangs and scythe men cutting weeds and underbrush and throwing this into the gullied roadway to be covered by the scraper gangs following. Many such spots were put in passable condition.

Elk City's "good roads day" will probably be made an annual affair, but it is expected to have even greater results than would come from an annual working of dirt roads. It is planned to take up permanent improvement of all main thoroughfares, one by one. Outcroppings of shale are frequent throughout the county, and this natural surfacing material can be had at the bare expense of distribution by wagon, wherever it is required. Elk City will be on the cross-state highway planned by the Legislature, and citizens of town and county are ready to do their part in improving the intersecting roads as soon as the state starts on the main highway.

The Effect of Park and Boulevard Improvements on Property Values*

By W. H. DUNN,

Superintendent of Parks, Kansas City, Mo.

The great value of a system of parks and boulevards to a municipality is now well recognized and many able writers and eloquent speakers have admirably presented the artistic side of the work. That park reservations beautified and made available for the pleasure and recreation of the people are necessary, is no longer questioned. If, then, we can show that the effect of these improvements on adjacent lands is to enhance their value in proportion to the cost of the improvements, we happily solve the problem, and all cities should be able to acquire and improve a beautiful system of parks and boulevards as an integral part of the city plan.

Let us discuss the question, then, from a purely practical standpoint, a business point of view, if you please. I would add to the park reservations the boulevard and connecting parkway plan, affording fine pleasure driveways upon which desirable residential frontages may be obtained. If this plan is followed, and a comprehensive connected system of parks, parkways and boulevards commensurate with the size, importance and civic spirit of your city be adopted (this work should be studied and recommended by a broad minded, competent landscape architect), and the improvement work carried out with great care and attention to detail, I undertake to say that any wide-awake city can establish its park system without one cent of general indebtedness to the city. In other words, the enhancement in values of benefited lands will be more than sufficient to pay all the cost of the acquisition and improvement of the park system. This will im-

press you as possibly being a too optimistic view, yet in our own city it is a fact recognized and not disputed, with reference to boulevards and to a somewhat less degree with reference to parks and parkways.

In the annual report of the Kansas City Board of Park Commissioners for 1910, we have shown by actual figures a clear net enhancement of values on a boulevard selected to analyze this very question. This boulevard is over three miles in length and passes through several gradations of property, including some very ordinary residence sections, a semi-industrial territory and a moderately high-class residential territory. The boulevard for its entire length is 100 ft. wide, and for its greater distance was widened from an ordinary 60-ft. street by the condemnation of 20 ft. on each side of the street. The benefit district for this particular boulevard was confined to one and one-half blocks on each side and parallel with the same.

I quote from our report: "It is an established fact, well known to dealers in real estate, that during the past ten years many thousands of people have been attracted to Kansas City as a place of residence by her fine exhibition of civic spirit, the most conspicuous products of which are her magnificent parks and pleasure grounds. Many men who have been successful in business in town and village within the territory tributary to Kansas City have felt the spell of her influence, and when retiring from active labor have built beautiful homes along our boulevards and settled here to rear and educate their children. Other thousands among the industrial classes have likewise come, attracted by the same advantages, to seek employment here and swell our population. All this has served not

*Paper presented at the convention of the American Association of Park Superintendents, Boston, Mass.

only to enhance our real estate values, but to create a real estate market where none before existed. The figures given in this report, collected by the board's accountant, show the powerful influence which the establishment of our boulevards has had upon land values. On Benton Boulevard, upon which the abutting property has responded in a less degree, in increments of value, than on any other boulevard in the city, it is shown conclusively that the increase in value has been more than 183 per cent. since the establishment of the boulevard, and that after deducting the cost to the property owner of every class of improvements with which this frontage has been assessed, and deducting also the average increase of land values throughout the entire district, which includes increments due to this and other park improvements in the same district, we have a clear net profit, demonstrably due to the boulevard, of approximately 44 per cent. But upon other boulevards, notably Armour, Gladstone, Linwood, Gillham Road and the Paseo, the land gain has been from 200 to 500 per cent., the greater portion of it being directly attributable to the establishment of the boulevards.

"In the same manner, but to a lesser degree, our parks have enhanced values, and the proof is incontestable that the construction of our park and boulevard system has been a profitable industry for the taxpayer. Moreover, our parks have also been established and administered in the interest of the common people; and, while they fulfill the artistic demands of a well planned system of ornamentation, they are intended for everyday use and are serviceable to the everyday citizen and the toiling masses."

To obtain this enhancement in property values, three important things should be kept in mind:

First: A well studied and comprehensive plan by a competent landscape architect.

Second: Proceed under this plan on the theory that certain areas of lands will be benefited.

Third: Execute the plans with the greatest attention to detail of construction.

The necessity of a broad and comprehensive plan does not admit of discussion, since any haphazard selection of park lands or boulevards cannot create a harmonious system or any good ultimate result. Every city will present its own unique problems, and, since in all cases certain fixed conditions must be met, a careful study is necessary in order to harmonize the old and the new.

The advantage of acquiring park lands by special assessment rather than by bond issue is that by adopting the plan of assessments on benefited areas, you at once make the owner of those lands a partner in your work. He says: "My land is assessed a certain amount for the park improvements in this district. I will see what it means." He takes a keen interest in all of the plans when you assess his land directly for a definite park improvement, and he knows every other parcel of land within his district has been assessed in a like manner. He has a proprietary feeling in all your plans that might be entirely lacking were those plans being executed under a plan of general taxation.

Without careful attention to detail of construction and maintenance, you may utterly fail in the results you expect to attain; no matter what the plans may be, no matter what great and comprehensive schemes may be shown on paper, all these become practically valueless to the community unless intelligently and consistently executed and maintained. I desire to especially emphasize the necessity of great care in executing the plans, the application of the plan on the ground, if you please. Give attention to the details of grades, lines, curbing, sidewalk and paving surfaces, and, finally, trees and other plantations. It is careful attention to these details of construction and maintenance that adds to the distinction of park work. This

may be made especially true of boulevards; the uniformity of details carried throughout the length of a boulevard adds greatly to its attractiveness, causes the abutting property owner, who pays the bills, to do so cheerfully, and makes him your staunch supporter at all times.

A park system may be so comprehensively planned and executed as to reach and affect all the properties throughout the municipality and should be so laid out as to be accessible by short walks from any section of the city, and the benefit assessments so graded as to be spread equitably through the different districts—all land values will be found to be benefited to some degree.

Experience has proved that a carefully developed and properly maintained park system is a splendidly remunerative form of investment wherever this work has been properly executed and maintained, and that such work should be considered an investment and not a tax.

There have been many concrete instances where specific park improvements have greatly increased the value of adjacent lands. In Kansas City, at least, this is an eminently proper result, inasmuch as lands without improvements in this city are called upon to make the entire investment. Perhaps no other community has called upon its land owning citizens in the same measure to pay for practically its entire park and boulevard development. The essential value of such investment has been proven by the fact that this city is constantly attracting to itself the well-to-do residents of communities near by. Through this source alone the city adds greatly to its population, and especially that particularly desirable class of residents for which all cities compete, but who will seek only those cities made attractive and comfortable through this form of municipal government and investment.

That the effect of boulevard improvements will be to enhance the value of the abutting and contiguous lands to the extent, and in the majority of cases greatly in excess, of the cost of such improvements, seems to be true. The pavements, curbing and sidewalks need not to any appreciable extent exceed the cost for the same improvements on an ordinary residence street, but the boulevard must be selected in harmony with a comprehensive system of parks, parkways and boulevards for the whole city. The formal boulevard would become tiresome unless it connected with other interesting park features; the whole to be worked out for the best result obtainable for the entire community, and, when this is done, the connecting boulevards will be found to quickly respond in enhanced values, and other sections of the city will experience a general benefit by reason of the comprehensive plan.

That this general benefit is greater in actual enhancement of values of property than the cost of the Kansas City park system in its present stage of development is freely acknowledged, and the landowners of that city have now invested in the park system over eleven and one-half millions of dollars and are our staunch supporters for still more parks and boulevards. In Kansas City, at least, the effect of park and boulevard improvements has been the enhancement of land values far in excess of the whole cost of the acquisitions and improvements of the park system.

Resolutions recently passed by the Common Council of Auburn, N. Y., providing for the widening of Orchard Ave. at once, under the direction of the Superintendent of Public Works, settle a contest which has lasted for more than twenty years. Supt. Elbert C. Aldrich has prepared maps and plans on the basis of which the improvement can be made. These maps show condemnations of property and also grades and sidewalk widths. The street will be made 33 ft. wide.

Municipal Quarrying at Cranston, Rhode Island

By E. F. DURFEE*

When the city of Cranston first took up the proposition of getting the stone from a quarry we found it impossible to get any information on the equipment necessary or the cost of such work. The following account of the work being done by the city may be of interest to other engineers wishing to take up a similar experiment.

The ledge is located about a quarter of a mile from the nearest house, making it unnecessary to cover any of the blasts. It has a face of from 20 to 40 ft. with about 200 ft. front. At the top we have a No. 3 Ingersoll drill that is used only to sink holes from 12 to 20 ft. deep. There is also a No. 2½ drill located at the foot, used only to get the base or foot of the ledge, drilling holes from 4 to 10 ft.

in which can be placed powder or dynamite that will throw out hundreds of tons more. The larger stones loosened by these blasts are then drilled with a small air hammer drill which drills holes from 6 to 12 ins. deep and about 1 in. in diameter. In these holes are placed about one-quarter of a stick of dynamite. Any stone left too large for the crusher are then broken by hand sledges and thrown back into piles, as shown in one of the accompanying illustrations. The stone is then taken and loaded into a car, about 4 tons to a load, and hauled by a horse to the crusher about 500 ft. to one side of the ledge.

The crusher used is a 12x24 Reliance and is run by a 35 HP. motor. The tracks for the stone cars are elevated

CITY OF CRANSTON, R. I.
Daily Report of the Stone Crushing Plant.

July	Date.	Tons of stone.	Tons of dust.	Men at \$2.00.	Men at \$2.15.	Drilling.	Fore-man.	Engineers.	Electric power.	Dynamite used.	Miscellan's cost.	Total cost.
"	1	\$74.10	\$9.25	\$22.00	\$30.10	\$13.95	\$4.00	\$3.00	93 C.H.	.....	\$4.15	\$77.20
"	2	90.47	18.21	22.00	31.78	13.80	4.00	3.00	130	.....	4.15	78.73
"	3	111.55	23.67	22.00	36.55	13.80	4.00	3.00	114	.....	4.15	83.50
"	5	96.85	16.20	18.00	38.70	12.47	4.00	3.00	148	1 box	4.15	80.32
"	6	91.60	27.65	20.00	36.55	55.13	4.00	3.00	153	.....	4.15	81.50
"	8	91.90	24.72	18.00	36.55	13.80	4.00	3.00	153	.....	4.15	79.50
"	9	93.25	20.32	19.11	31.06	11.13	4.00	3.00	124	.....	4.15	71.35
"	10	112.37	14.32	18.00	36.25	10.80	4.00	3.00	123	.....	4.15	77.31
"	11	98.20	18.62	18.00	40.55	10.80	4.00	3.00	31	.....	4.15	89.50
"	12	86.90	18.43	20.43	29.56	10.80	4.00	3.00	150	.....	4.15	71.94
"	13	86.85	27.82	22.00	35.55	13.80	4.00	3.00	206	.....	4.15	82.00

In the large holes we place from 20 to 30 sticks of 60 per cent. dynamite. These are exploded from a battery located in a building about 400 ft. to one side. The large blasts throw down several tons of stone, most of which is too large for the crusher, and it also many times opens up seams

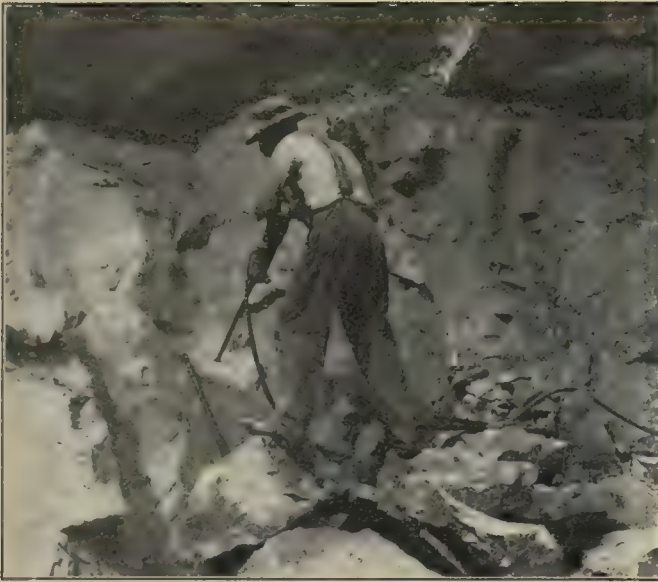
*Engineer in Charge, Office of City Engineer and Highway Surveyor, Cranston, R. I.

about 3 ft. above the platform, thus giving ample room for the car to be dumped and taken back to the ledge without delay. The stone, after being crushed and screened, is carried by chutes to the different bins.

The cost of the work is best shown by the cost sheet kept from day to day, a copy of which, for two weeks, is shown. The \$2.15 is the price paid for the stone breaker,



MUNICIPAL ROAD METAL QUARRY NEAR CRANSTON, R. I.—SHOWING QUARRY FACE AND STONE THROWN DOWN BY BLASTS.



DRILLING WITH HAND AIR HAMMER DRILL AT THE CRANSTON MUNICIPAL QUARRY.



LOADING CAR WITH STONE FOR CRUSHER AT THE CRANSTON MUNICIPAL QUARRY.

\$2 for the men to load the cars, and the electric power cost is the reading of the meter taken every night after work. Only one engineer is required. He looks after the two meters and also cares for the boiler that runs the steam drill. The air for the hammer drill is compressed by a 6x6 Blaisdell air compressor, run by a 10 HP. motor.

This sheet is a fair average of the regular weekly cost, all work being done in a 9-hour day. In this is included the foreman, at \$4; one stone weigher, at \$2; a blacksmith, at \$2.50; three water and drill boys, at \$1; two steam drillers, at \$3; and one man to run the air drill at \$3.

The stone is of an exceptionally hard nature, as shown by the following test report made by the U. S. Office of Public Roads.

Specific gravity	2.65
Weight per foot	165 lbs.
Water absorbed per cu. ft.	0.31 lbs.
Per cent. of wear	8.6
Hardness	17.8
Toughness	9
Cementing value	good

Remarks—Specimen is a light gray coarse grained, gneissoid rock, composed essentially of sericitized orthoclase, quartz and chloritized biotite.

The Commissioner's Court of Coke County, Tex., has offered to appropriate \$3 for every \$1 contributed by the citizens of the county for the construction of a highway between Robert Lee and Bronte.



CRUSHING PLANT AT THE CRANSTON MUNICIPAL QUARRY—SHOWING CRUSHER, CHARGING PLATFORM, SCREEN AND STORAGE BINS.

New State Road Law in Arizona

The State Legislature of Arizona has enacted a new and comprehensive set of road laws regulating the construction, maintenance and improvement of state roads and bridges, creating the office of State Engineer, making an appropriation for carrying out the provisions of the act, fixing a tax levy to provide funds for the same and authorizing and directing the expenditure of the appropriation.

The text of the law follows:

Section 1. All highways and parts of highways and bridges which were heretofore constructed by the Territory, or the State, of Arizona, or which shall hereafter be constructed or improved under the provisions of this Act, shall be State Highways and Bridges.

Sec. 2. All highways and bridges constructed, improved or maintained, under the provisions of this Act shall be constructed, improved, and maintained according to the plans and specifications made for such purpose by the State Engineer, herein provided for, subject to the restrictions and limitations of this act, and shall be only for the industrial development of the State.

Sec. 3. The office of State Engineer is hereby created, and there shall be appointed by the Governor, by and with the advice and consent of the Senate, a State Engineer, who shall hold his office for two (2) years from the date of his appointment and until his successor shall be appointed and qualified. Such State Engineer shall be a practical, competent civil engineer. The salary of the State Engineer shall be Three Thousand Dollars (\$3,000.00) a year, payable semi-monthly, together with the necessary actual expense, not to exceed Two Thousand Five Hundred Dollars (\$2,500.00) per year, required to perform the duties of his office.

Sec. 4. The State Engineer shall, before entering upon the discharge of his duties, execute a bond, with two or more sureties, to be approved by the Governor of the State of Arizona, and payable to the State of Arizona, in the sum of Five Thousand Dollars (\$5,000.00) conditioned that he will faithfully discharge his duties as such State Engineer, be responsible for all public property in his possession, and turn the same over to the Board of Control on demand.

Sec. 5. The duties of the State Engineer shall be to aid the Board of Control and the Boards of Supervisors of the several Counties, in such manner as the Board of Control may require, in the selection and designation of state highways and bridges. It shall also be the duty of the State Engineer to aid by his advice the County Superintendents of Roads and Bridges of the various Counties of the State relative to the method of construction and maintenance of the county roads and bridges.

Sec. 6. The Boards of Supervisors of the several counties shall act with the State Engineer in the selection of the highways and bridges to be constructed under this Act, within the limits of their respective Counties and said State Engineer shall, on the request of the Board of Control of the State, or any Board of Supervisors of any County, be required to select, map, plat, and furnish estimates of the cost of construction of, State Highways and Bridges, or extensions thereof, proposed to be constructed under the provisions of this Act, which data and information, as specified above, shall be furnished free of charge to such Boards requesting same.

Sec. 7. There shall be annually levied and collected in the same manner in which other State taxes are levied and collected, by a levy by the officials provided by law, a sufficient tax to raise the sum of Two Hundred and Fifty Thousand Dollars (\$250,000.00) annually, said levy to be made upon the taxable property within the State, for the purpose of raising a fund to be known as the State Road Tax Fund, to be expended for the construction, reconstruction, repairing, improving and maintaining public highways, roads and bridges as follows:

Twenty-five per cent. (25%) of the "State Road Tax Fund," herein provided for, shall be subject to be paid out upon the authority and under the direction of the State Board of Control and State Engineer, who are hereby charged with such responsibility;

Provided, that twenty-five per cent. (25%) of the said State Road Tax Fund herein provided for, for the fiscal year beginning July 1st, 1912, and ending July 1st, 1913, shall be subject to be paid out, upon the authority and under the direction of the State Board of Control, upon claims approved by the State Engineer and the Board of Control and audited by the State Auditor, for any work done under the authority of the Territory of Arizona or the State of Arizona, in the construction, reconstruction, repairing, improving and maintaining of public highways, roads and bridges prior to July 1st, 1912; Provided, further, that such part of the said twenty-five per cent (25%) for the fiscal year from July 1st, 1912, to July 1st, 1913, as is not expended for said purpose shall be expended for the construction, reconstruction, repairing, improving and maintaining

of public highways, roads and bridges, under the provisions of this Act, within the fiscal year from July 1st, 1912, to July 1st, 1913. The Board of Control and the State Engineer are hereby charged with the responsibility of making said expenditure.

Seventy-five per cent (75%) of such State Road Tax Fund, herein provided for, shall be apportioned to the several counties in the amount to each County of seventy-five per cent. (75%) of the taxes collected under this Act by said County, and such amount shall be subject to be paid out for the construction, reconstruction, repair, improvement and maintenance of public highways, roads and bridges in the manner as in this Act provided, for the work in this Act provided for within such County, upon the authority and under the direction of the County Board of Supervisors of such County and the State Engineer, who are hereby charged with such responsibility.

Provided, that no obligation shall be assumed or expense incurred under the provisions of this Act, within any fiscal year, in the amount of any sum in excess of the levy herein provided for and the money actually collected under said levy.

Provided, that Maricopa County shall be entitled to have the proportion of the State Road Tax Fund paid into said State Road Tax Fund for the fiscal year 1912-1913 by said County, expended upon that portion of the State Bridge now incomplete, and known as the "Tempe Bridge."

Sec. 8. Upon the adoption by the Board of Control or the Board of Supervisors, under whose direction the work is to be done, of the plans and specifications for the construction of any State Highway or Bridge, or extension thereof, it shall be optional with the Board of Control or Board of Supervisors, as the case may be, to have any or all work provided for by this Act done either by contract or under a wage system. In case the work is to be done by contract it shall be the duty of the said Board of Control, or Board of Supervisors, to advertise in a newspaper published in such County, where the proposed work is located, for sealed proposals for the doing of such work. Such notice shall be given for at least thirty (30) days prior to the opening of such sealed proposals, which shall be directed to the said Board of Control, or the Board of Supervisors as the case may be, and marked "State Highway Contract." Upon the opening of such proposals, the contract for the work shall be let to the lowest responsible bidder; provided, however, that the said Board of Control, or Board of Supervisors, shall have the right to reject any or all bids and may proceed to construct said work under their own supervision, without contract. In case the contract is awarded, as herein provided, the successful bidder shall enter into such a contract with the State of Arizona, or the County in which the work is to be done, as may be prescribed by the said Board of Control, or the Board of Supervisors, a copy of which contract shall accompany the plans and specifications. The successful bidder shall also file with said Board of Control, or the Board of Supervisors, a good and sufficient bond, payable to the State of Arizona, or the County, in a sum not less than twenty-five per cent. (25%) of the contract price of said work, conditioned upon the faithful performance of said contract.

Sec. 9. No person not a citizen or ward of the United States or who has not declared his intention to become a citizen, shall be employed upon, or in connection with, any State, county, or municipal works or employment; Provided, that nothing herein shall be construed to prevent the working of prisoners by the State, any county, or by any municipality thereof, on street or road work, or other public work; and provided further, that the Board of Control shall require all contractors, under the provisions of this Act, to comply with the restrictions in this section contained.

Sec. 10. All roads and bridges, when constructed, shall thereafter be maintained and improved when necessary, at the expense of the County in which located, out of the seventy-five per cent. (75%) of the taxes collected under this Act from said County, under the joint auspices and direction of the State Engineer and Board of Supervisors of such County.

Sec. 11. It shall be the duty of the State Engineer upon request of the Board of Supervisors of any County where work is being done under the provisions of this Act, to furnish such Board of Supervisors with a duplicate copy of the plans and specifications for such work.

Sec. 12. It shall be the duty of the State Auditor to keep a complete and accurate account of all moneys received for and expended out of the State Road Tax Fund, and to keep and preserve all documents, books, and papers, which may be filed with him relative to such highways and bridges.

Sec. 13. Lands adjacent to a State Highway may be entered upon and occupied for the purpose of opening or constructing a drain or ditch so as to properly drain such highway;

1. By the State Engineer or his servants or agents or employees at any time for the purpose of making surveys for such drain or ditch.

2. By the State Engineer, his agents or servants, whenever, in the discretion or judgment of the State Engineer, after the completion and acceptance of the highway, for the purpose of opening, constructing, or maintaining, ditches or drains upon such lands, necessary for the proper maintenance of such highways.

Sec. 14. The Board of Control, with the consent and approval of the Board of Supervisors of the County where the work is being done or the property affected is situated, may agree with the owner of lands entered upon and occupied, as provided in the preceding section, for the payment of damages caused by such entry, or for the payment of damages for the taking and using of any rock, earth, or timber, from any adjacent unimproved land, or, if unable to so agree, the right to enter and occupy such lands or to take and use such rock, earth, and timber may be acquired, and the damages therefor shall be ascertained as provided in the condemnation law. Such damages shall in the case of a State Highway be paid out of the seventy-five per cent. (75%) of the total sum levied under this Act in the County wherein said work is being done or the property is situated, and subject to be paid out under the authority of the County Board of Supervisors and the State Engineer as in this Act provided.

Sec. 15. No street, surface, steam or electric road shall be constructed or improved under the provision of this Act, nor shall any person, firm or corporation enter upon or construct any such works in or upon any such highway or bridge of the State, other than crossing said highway, and any person, firm or corporation violating any provision of this Act shall be liable to a fine of Five Hundred Dollars (\$500.00) for each such violation, to be recovered by suit by the Board of Control and paid to the State Treasurer to the credit of the State Road Tax Fund, and may also be removed therefrom as a trespasser by the Board of Supervisors of the County or Counties in which such trespass shall have been committed.

Sec. 16. All Acts and parts of Acts in conflict with the provisions of this Act, and especially that certain Act, entitled "An Act Relating to the Construction, Maintenance and Improvement of State Roads and Bridges, Creating the Office of State Engineer and Prescribing the Duties thereof and Compensation therefor," approved May 18th, 1912, are hereby repealed.

Sec. 17. Whereas, an urgent necessity exists for the construction, maintenance and improvement of State Roads and Bridges and for the creation of the office of State Engineer, and,

Whereas, an urgent necessity exists for making an appropriation to carry out the provisions of this Act, and

Whereas, the provisions of this Act are necessary to the public peace, health and safety, an emergency is hereby declared to exist and this Act shall be in full force and effect from and after its approval by the Governor, and is hereby exempt from the operation of the Referendum provision of the State Constitution.

Lamar Cobb, State Engineer, has forwarded a letter which comprises a set of general instructions regarding the law to the Board of Supervisors in each county in the state. The letter calls attention to the clause in Sec. 7, which states that no obligations shall be assumed or expenses incurred under the provision of the act within any fiscal year in the amount of any sum in excess of the levy provided for and the amount actually collected under said levy. Consequently, in accordance with this provision, as construed by the Supreme Court, there will be no funds available for the construction of state roads earlier than Dec. 1 of the current year. The supervisors are advised, however, that the selection of routes and the location of proposed construction work should be taken under consideration as soon as possible.

The attention of the supervisors is also called to the fact that the county authorities will not make a separate levy for state roads as under the old law, as the levy for this purpose will be included in the general state levy along with those for all other state institutions, and that 75 per cent. of all the money collected for state road purposes will be expended on the state highways as selected by the Boards of Supervisors and the State Engineer.

Mr. Cobb states that it will be his policy to defer to the will of the supervisors in the selection of state highways in all cases, unless a serious engineering problem should be involved, and also in conducting the work of construction, he will only request that he be permitted to select the engineer who is to direct the work, all other employees to be named by the Board of Supervisors.

The statement is made that it is impossible at this time

to fairly approximate the amount that the various counties will receive under the act, as the amount to which each county is entitled will be in the same ratio to the county portion, which is 75 per cent. of the total appropriation or \$187,500, as its assessed valuation is to the total assessed valuation of the state.

Mr. Cobb submits an estimated apportionment based on the 1911 assessment roll, which he states will give only a rough approximation, as there will be a wide variation in the percentage of increase of the assessed valuation of the different counties over last year.

The estimate of the apportionment follows: Northern Division: Apache County, \$2,250; Mohave, \$4,500; Navajo, \$4,500; Coconino, \$7,875; Yavapai, \$21,000; Maricopa, \$14,000; total, \$54,125. Eastern Division: Graham, \$6,000; Pinal, \$6,750; Gila, \$13,500; Greenlee, \$13,875; Maricopa, \$14,000; total, \$54,125. Southern Division: Santa Cruz, \$4,500; Yuma, \$7,500; Pima, \$15,000; Cochise, \$38,250; Maricopa, \$14,000; total, \$79,250.

The repetition of Maricopa County's apportionment is arbitrary and is mentioned merely to show that the county will be in three divisions under the provisions of the law.

The State Board of Control and the State Engineer have under their direction the expenditure of 25 per cent. of the total appropriation, or \$62,500. However, the law also provides that the entire deficit in the state road tax fund on July 1, 1912, shall be paid out of this 25 per cent. This deficit amounts to approximately \$50,000. It further provides that the amount contributed by Maricopa County to this 25 per cent. portion, approximately \$12,500, shall be expended on the Tempe Bridge, now being constructed at Tempe, and in a separate law, known as the Chevalon Creek Bridge bill, \$5,500 is also charged against this 25 per cent. portion for the fiscal year 1912-13. This charge more than equals the entire 25 per cent. portion for this year. However, the receipts from delinquent taxes for the year 1911-12 will probably cover the difference. These provisions in the law which wipe out entirely the funds proposed by this act to be placed at the disposal of the state authorities were not in the original bill as introduced.

It is further stated in the letter that the Attorney General, in construing Sec. 6 of the act, holds that all the engineering expenses of all state road work, whether done under the direction of the State Board of Control or that of the County Boards of Supervisors, must also be charged against this 25 per cent. portion of the state road tax fund. According to this there will be no funds provided by this act to pay the necessary engineering expenses for this year. However, the Legislature passed an act known as the Automobile Tax Law, providing for a state tax of \$5 on all automobiles not exceeding 40 HP., \$10 for all over 40 HP., \$2 for motorcycles and \$5 for chauffeurs operating motor vehicles for hire. The carrying out of the provisions of this law will raise approximately \$15,000, which must be paid to the Secretary of State on or about the fifteenth day of September and must be converted into the state road fund.

The sum necessary to defray the engineering expenses is estimated to approximate 10 per cent. of the total amount expended, which for this year would be about \$20,000. This will include cost of all preliminary surveys, location surveys, maps of locations showing topography, designs of bridges and culverts, estimates of cost, inspection during the course of construction by the State Engineer or his agents and all other items. The cost of all construction, including superintendence, right of way and all survey work incidental thereto will be borne by the counties and paid out of their 75 per cent. portion of the state road tax fund.

For the purpose of systematizing the work the state has been divided into three districts, as shown above—Northern, Eastern and Southern. Each of these districts will be placed in charge of an engineer, who will make all the necessary surveys in his respective district. Maps, plans, estimates, etc., will be made at the office of the State Engineer.

The personnel of the organization, at present, is as follows: Lamar Cobb, State Engineer; Thomas F. Nichols, Office Engineer and Stenographer; C. C. Berault, Clerk; J. S. Barlow, Division Engineer of the Northern Division; Frank A. Goodman, Division Engineer of the Eastern Division; James A. Parker, Division Engineer of the Southern Division.

This organization of the engineering department has been decided upon for economic reasons.

The statement is made in the letter that the department would like to begin construction at once in every county and to continue the work until all counties are connected by state highways, but the funds available will permit of only a limited amount of work being done each year. As it is not possible to carry on construction work in every county in the state at the same time, it is thought the fairest method will be to take the counties in rotation, so that where work is done last this year it will be first next.

Bitumen Content of Coarse Bituminous Aggregates*

By PRÉVOST HUBBARD†

In the construction of city pavements of the bituminous type, which are mainly sheet asphalt, the character and quantity of bitumen suitable for the preparation of the bituminous aggregate has received a great deal of study. No less attention has been paid to the proper grading of the mineral aggregate, and as a result of this study certain facts have been determined which make it possible to specify the correct proportion and characteristics of both bitumen and mineral matter, within certain comparatively narrow limits. In all carefully controlled work, however, the exact proportion of bitumen to mineral matter for given materials is determined by test, and constant inspection is required to see that this proportion is maintained, or varied to suit unavoidable variations in the grading of the mineral aggregate.

In the construction of bituminous macadam roads at the present time, a much greater variety of bitumens is customarily employed, both as to type and consistency. But little attention is paid to the grading of the aggregate, other than to require a given commercial size of crushed rock, and the proportioning of bitumen and aggregate is given but scant attention compared with sheet asphalt work. While it may be argued that the same refinements of construction are not as essential for a bituminous macadam road, the necessity for careful inspection and examination of the materials entering into such construction is just as great as in the case of sheet asphalt pavements. It is the author's conviction that until systematic inspection and testing of these materials of construction are generally called for by highway engineers the bituminous macadam will never emerge completely from the experimental stage.

In this connection certain facts of interest may be developed from a consideration of the bitumen content of coarse bituminous aggregates such as are used in bituminous macadam work. Two general methods of constructing bituminous macadam roads are at present followed, one known as the penetration method and the other as the mixing method. In the former, the crushed stone is first laid on the road and partially compacted, after which the heated bitumen is poured over the surface with the expectation that it will penetrate the road for a given depth and coat the stone more or less uniformly. In the latter, the crushed stone is thoroughly mixed with hot bitumen before it is placed upon the road. The first method, while frequently productive of satisfactory results when carefully conducted, is less susceptible of refinement and need not be further considered in this paper. The mixing method on the other hand is susceptible of considerable refinement. But no matter how carefully the bitumen and aggregate are combined, unless both constituents are systematically tested for certain properties the success or failure of a given piece of work can furnish no information of value to highway engineers in general, and but little useful information to the engineer actually supervising the work.

It is evident that for a given mineral aggregate and a binder of given consistency, their proportion must lie within certain narrow limits to produce the best results. The type of stone, the type of bitumen and the conditions to which the road will be subjected after completion are, of course, modifying factors and should be taken into account. In the present discussion, the last consideration may, however, be eliminated. In general, it may be said that best results will be obtained by combining the aggregate and bitumen in such proportions that the entire aggregate will be coated with bitumen in amount equal to the maximum quantity of bitumen which can be held after compaction without producing an undesirable surface under conditions to which the finished road will be subjected.

In preparing a bituminous aggregate the individual constituents may be proportioned either by volume or by weight. The former method is most generally employed in construction work, but the volume equivalents of certain weight proportions are usually taken, for the sake of convenience, and proportions are stated by weight in reporting results. In the laboratory examination of bituminous aggregates, proportions of the various constituents are almost invariably reported as percentage by weight. It is, of course, evident that either method of measuring may be made to give the correct proportions, for any individual mixture composed of given constituents. The exact proportions are usually determined by the behavior of trial batches during and after compacting, although the approximately correct proportions may be calculated in advance.

While this is satisfactory for any particular piece of work, a report of proportions (whether by actual weight

TABLE I.—SPECIFIC GRAVITY OF ROCKS USED IN ROAD CONSTRUCTION.

Name.	Specific Gravity.		
	Minimum.	Maximum.	Average.
Limestone	2.00	2.85	2.65
Chert	2.00	2.95	2.60
Granite	2.00	3.00	2.65
Sandstone	2.00	3.25	2.60
Slag	2.00	3.90	3.25
Rhyolite	2.05	2.90	2.55
Syenite	2.15	3.05	2.65
Andesite	2.20	2.95	2.70
Dolomite	2.30	2.90	2.70
Basalt	2.30	3.05	2.85
Quartzite	2.35	3.15	2.60
Conglomerate	2.50	2.65	2.60
Shale	2.50	2.70	2.65
Felsite	2.50	2.80	2.65
Gneiss	2.60	3.20	2.75
Diabase	2.60	3.20	2.90
Slate	2.60	3.35	2.75
Marble	2.65	2.85	2.75
Schist	2.65	3.20	2.95
Peridotite	2.65	3.55	2.95
Amphibolite	2.70	3.10	3.00
Diorite	2.70	3.35	2.75
Epidosite	2.70	3.30	3.05
Gabbro	2.75	3.65	2.90
Ecolite	2.95	3.65	3.20

or by volume) should be accompanied by other data in order that the stated proportions may be correctly interpreted with reference to other work of similar nature. Apart from the grading of the mineral matter and the consistency of the bitumen, account should also be taken of the wide variations in specific gravity of both mineral matter and

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bituminous materials commonly employed. A consideration of the following tables will illustrate the importance of this matter.

In Table I, the specific gravities of certain rocks used for road building are taken from a publication (Maximum and minimum results on rock samples corrected to Jan. 1, 1911) of the U. S. Office of Public Roads. It will be seen that great differences exist in the density of road making rocks, the maximum variations being from 2.00 to 3.65 if slag is not considered. While these extremes are not usually encountered in road work, it is nevertheless interesting to note the volume relations which would exist if the limestone and eclogite shown in the table were crushed so as to produce aggregates identical as to sizes, and then mixed with a known percentage by weight of a given bitumen.

Assuming that a cubic yard of crushed limestone with a specific gravity of 2.00 weighs 2,000 lbs., then a cubic yard of eclogite with a specific gravity of 3.65 crushed to the same size would weigh 3,650 lbs. For a 6 per cent. mix this would mean that 128 lbs. of bitumen would be required in the first case, and 233 lbs. in the second case, for a cubic yard of aggregate. The difference, 105 lbs., would for a given bitumen be equivalent to a variation of from about 45 per cent. to 81 per cent. in the number of gallons per cubic yard of rock. If the variation in the densities of bituminous road binders is further taken into account, together with the percentages of extraneous materials which are found in certain types of bitumens, the

to determine the exact volume proportions in cubic yards and gallons used, owing to considerable variations in the volume of a unit weight of aggregate in different stages of compaction. If the bituminous material originally used contains an unknown amount of mineral matter or organic matter not bitumen, he may also be unable to accurately determine the proportions (either by weight or by volume) of the original constituents which entered into the mix. Moreover, if the aggregate contains any considerable quantity of fine material he may be unable to extract all of the bitumen, owing to the phenomenon of adsorption which has been repeatedly noted by many investigators.

In regard to bitumen adsorbed by the aggregate, which cannot be removed by solvents, it would appear reasonable to consider this as unavailable material, and therefore, to eliminate it from consideration, as it is evident that this property of the aggregate must be satisfied before any binding value can be developed from the bitumen which is added to the mix. In coarse bituminous aggregates, however, so little bitumen is adsorbed that this factor becomes almost negligible.

While the subject would seem to be in a more or less chaotic condition in so far as extreme accuracy is concerned, it appears to the author that a much more rational basis of comparison is possible than that ordinarily used. He would, therefore, suggest that in the examination of a prepared bituminous mix the chemist always report the specific gravity of both aggregate and pure extracted bitumen in addition to the usual results. If this suggestion is followed it is believed that an intelligent comparison of different bituminous mixes can be made with little difficulty.

For example, we may consider a case where wide variations exist in the specific gravity of both aggregate and bituminous material for two different mixes. For a basis of comparison it may be assumed that the two aggregates are found to be practically identical in so far as grading is concerned, and that the percentage by weight and the consistency of the bitumens are the same. According to the ordinary interpretation of results these mixtures would be equivalents. If, however, it is found that the first mix is composed of an aggregate with a specific gravity of 2.50 while the extracted bitumen shows a specific gravity of 1.17 and that the aggregate of the second mix has a specific gravity of 3.50 while the extracted bitumen shows a specific gravity of 0.96, the percentage of each constituent divided by its specific gravity would then give a rational volume proportion as follows:

Constituents.	Per cent. by wt.	Specific gravity.	% wt. Sp. Gr.	Rational Proportion.	Rational per cent.
First mix:					
Aggregate	94	2.50	$\frac{94}{2.50}$	= 37.6	88.0
Extracted bitumen.	$\frac{6}{100}$	1.17	$\frac{6}{1.17}$	= 5.1	12.0
Second mix:					
Aggregate	94	3.50	$\frac{94}{3.50}$	= 26.9	81.0
Extracted bitumen.	$\frac{6}{100}$	0.96	$\frac{6}{0.96}$	= 6.3	19.0

By the determination of what has been termed the rational per cent., it is evident that the first mix has a bitumen equivalent of about two-thirds that of the second mix, although the percentages by weight are the same. The rational variation, 7 per cent., is certainly sufficient to mean the difference between success and failure for certain bituminous aggregates.

In conclusion it may be stated that the rational per cent. of bitumen will not only serve as an improved means of comparing different bituminous aggregates which are examined, but may be used to advantage in calculating in advance the proper proportions for a mix if the properties of the constituents of the mix are previously determined.

TABLE II.—SPECIFIC GRAVITY OF BITUMINOUS ROAD BINDERS USED IN ROAD CONSTRUCTION.

Type of Material.	Specific gravity.
Blown Oil-Gilsonite Compounds	0.955—0.983
Oil Asphalts	0.985—1.015
Fluxed Native Asphalts	1.036—1.111
Refined Water-Gas Tars	1.160—1.175
Refined Coal Tars	1.200—1.300

proportioning of the constituents of a mix by weight may show much greater differences in volume proportions.

Considering the range in density of the bituminous materials shown in Table II, which has been prepared from numerous analyses of road binders suitable for use in bituminous mixes, the variation in weight per gallon will be found to be from 7.96 lbs. to 10.83 lbs. If these figures are taken in connection with the extremes in density of the road building rocks, a 6 per cent. mix might mean anything from 11.8 gals. per cu. yd., in the combination of refined coal tar with the limestone, to 29.3 gals. per cu. yd. in the combination of a blown oil-gilsonite compound with an eclogite. Moreover, the coal tar with a density of 1.300 would probably contain over 30 per cent. by weight of free carbon, which would reduce the number of gallons of actual bitumen from 11.8 to approximately 9.3 gals. per cu. yd. of stone. It is perfectly evident that with such a variation the term 6 per cent. can have but little value.

While the above figures are calculated from extremes, it is nevertheless true that wide variations may exist where the more common types of rock are considered. Thus, for diabase, with a variation in density of from 2.60 to 3.20, a 6 per cent. mixture might mean 12 gallons of refined coal tar bitumen, or 26 gallons of a blown oil-gilsonite compound, per cu. yd. of crushed rock. It is evident, therefore, that a statement of volume proportions of aggregate and bitumen offers a much more satisfactory basis of comparison than weight proportions.

An engineer who superintends the construction of a bituminous road or pavement can, of course, state the volume proportions of the constituents which he uses in a given mix, but if the bituminous material contains considerable mineral matter or organic matter not bitumen, he encounters a serious difficulty in stating the actual proportions of aggregate and bitumen. On the other hand the chemist who examines a mix can state the weight proportions of aggregate and bitumen but will often be unable

Reinforced Concrete Guard Rail Used in New York State

One of the incidental features of road construction in any but level country where fills and sidehill work are not encountered is the construction of proper rails or fences for the protection of traffic. Always a factor having much influence on the safety of the users of the road, the guard rail has become even a more necessary appurtenant structure since the automobile became so common on the country road.

Various forms of rail are used on country roads, probably the most common of the more pretentious forms being the carefully built wooden fence consisting of square top rails set with one edge upward, square or rectangular lower rails and square or round posts. The better structures of this kind are built with the joints in the top rail protected by metal strips, and are painted to further protect the wood from moisture. In some places gas pipe railings with posts set in retaining walls or in separate stones are used. Another form very common in some sections consists of a rough, low stone wall built up a foot or two above the general level at intervals and with iron rods set in the top stone at these high places to form pins over which roughly split rails are fastened. A variation of the "snake fence," so common in some sections, is also employed to some extent.

All of these rails, except those of gas pipe or the well built wooden fences, are not of sufficiently good appearance to use at the side of an improved road. Moreover, few of these forms are strong enough to escape injury in case an automobile runs into them nor to greatly lessen the injury sustained by the car and its occupants. Though, like most wooden structures, lower in first cost than those of more durable materials, the wooden guard rail has a comparatively short life and during that life needs more or less

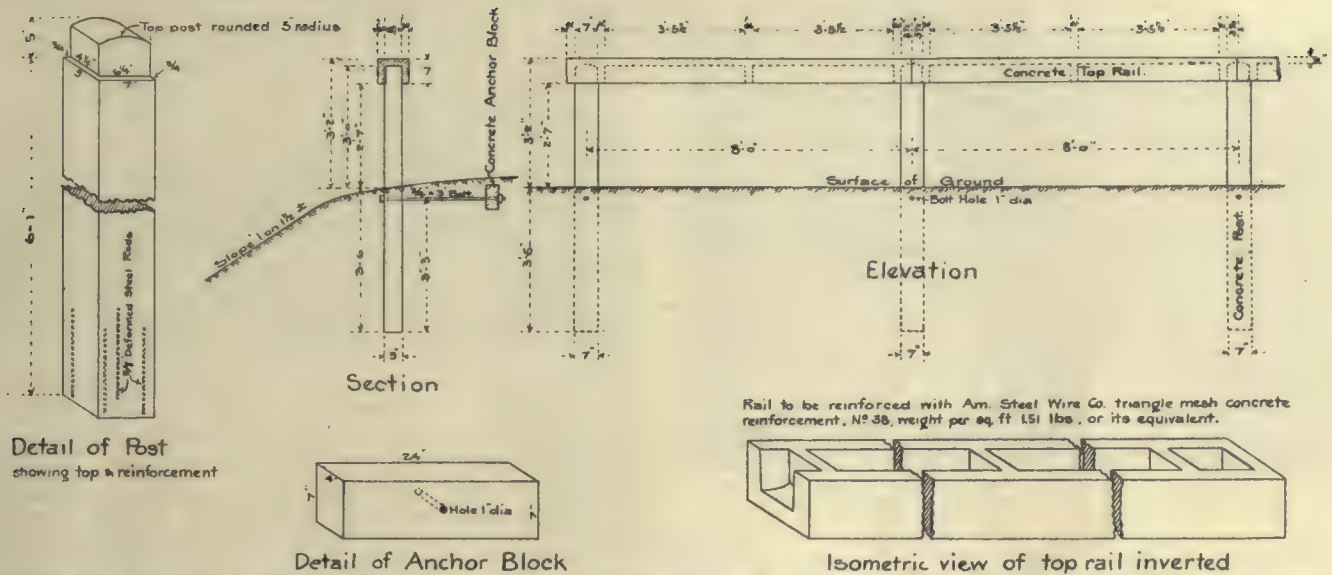
continuous maintenance by painting, the renewal of worn out or damaged parts, and minor repairs of one kind and another.

In order to provide a rail possessing a greater degree of permanency and, therefore, a cost lower in the long run, as well as greater strength, both real and apparent, concrete has been used to some extent. In the issue of November 4, 1911 ("The Roads of Monroe County," p. 212), reference was made to a reinforced concrete guard rail devised by J. Y. McClintock, County Engineer of Monroe County, New York, and used to a considerable extent by him in his work. This rail has now been adopted as standard by the New York State Highway Department and is specified in many of the road contracts now in force. A company, known as the Concrete Guard Rail Co., with headquarters at Rochester and a factory at Fisher's Station, N. Y., has also been formed to control the manufacture of the rail in the state of New York, and at present is making from one and one-fourth to one and one-half miles of rail each week.

Briefly described the rail consists of reinforced concrete posts 5 ins. by 7 ins., in section and 6 ft. 6 ins. long, set 3 ft. 6 ins. into the ground at intervals of 8 ft. and surmounted by reinforced concrete rails 7 ins. deep and 9 ins. wide. The rails are cored out on the under side, so that the concrete is everywhere 2 ins. in thickness. At the center and at points near the ends, 2-in. ribs or webs of concrete extend across the rail. The center rib serves merely as a brace, while those near the ends form sockets which fit over the tops of the posts which are chamfered down and rounded to a 5-in. radius. The posts are reinforced with $\frac{3}{8}$ -in. twisted rods, one near each corner, and the rails with heavy expanded metal. When the rail is used on an embankment each post is anchored to a concrete



SETTING REINFORCED CONCRETE GUARD RAIL ON A HIGHWAY IN NEW YORK STATE—SHOWING USE OF RAIL ON FILLS AND METHOD OF ERECTING.



SKETCH SHOWING SECTION AND ELEVATION OF RAIL IN PLACE, DETAILS OF POSTS AND ANCHOR BLOCKS AND ISOMETRIC VIEW OF RAIL.

block 24 ins. long, 7 ins. high and 4 ins. wide, set about 3 ft. back from the post, in the embankment. A $\frac{3}{4}$ -in. galvanized steel rod threaded at each end to receive a nut, passes through anchor block and post and ties them. The details of the finished rail and of the posts, rails and anchor blocks are shown in the accompanying sketch.

The posts, when set 3 ft. 6 ins. in the ground, make the top of the rail 3 ft. 2 ins. above the ground. No fastenings of any kind are used to hold posts and rails together, the sockets in the rails fitting over the tops of the posts and leaving a small space between the ends of adjacent rails. The posts weigh about 225 lbs. each, and each rail weighs about 325 lbs. This weight, while sufficient to prevent accidental displacement of the rails is still small enough to

permit the lifting off of a rail to enable a vehicle to pass through or for any other purpose. In order to make the rail available on curves, the top rails are made in a number of shapes differing only in the angle at which the end sockets are set. These different shapes are designated by letters, and by reference to the manufacturer's list, rail may be ordered to fit whatever alignment exists on a given road. To facilitate setting posts where rock interferes with excavating the holes, the reinforcement in the posts is stopped 6 ins. from the bottom, so that that much can be more easily cut off. If more has to be taken off, the post may be cut with a hack saw, the time required by two men to do this being about 20 minutes, it is stated. Special posts are made 3 ft. long with the reinforcing steel projecting some 2 ft. at



REINFORCED CONCRETE GUARD RAIL IN PLACE ON A HIGHWAY IN NEW YORK STATE—SHOWING ADAPTATION OF RAIL TO CURVES.



TOP RAILS OF REINFORCED CONCRETE GUARD RAIL DRYING AT FACTORY YARD.

the bottom for use on retaining walls or in other places where such arrangement may be advantageous.

It is stated that the cost of this rail, in place on the road, is about \$1.25 per lin. ft., the figure being obtained from the average of bids for New York state road work. While this is several times the cost of wooden guard rail, it is expected that the absence of maintenance charges and the longer life of the concrete rail will make it the cheaper in the end, while, in the meantime, a rail of greater strength and more pleasing appearance will be in place on the roads.

Street Work in New Orleans

Street paving authorized in New Orleans, La., during the past year, including the installation of subsurface drainage, will cost \$535,344.54. A part of the work included in these figures has not yet been completed. The total cost of paving contracts completed was \$197,243.76, of which the city paid \$62,396.45, and the property holders the balance. The total cost of the contracts now under way will aggregate \$220,500, of which the city will pay \$154,500 and the property holders \$66,000. The total cost of the subsurface drainage contracts completed during the year was \$117,600.78, of which property holders paid \$19,553.47 and the city \$98,047.31. In addition to this, paving contracts, already authorized by ordinance, amounting to \$252,975, will be awarded in the near future.



TOP RAILS OF REINFORCED GUARD RAIL PILED FOR SHIPMENT AT FACTORY.

Of this amount the city will pay \$187,075 and the property holders \$65,900.

There are now filed in the office of the city engineer petitions for pavements which will cost nearly \$12,000,000, of which the city will be asked to pay \$4,000,000. The amount available for paving, however, is now exhausted, and there is little chance for more paving to be done this year except such as may be considered emergency work.

The streets on which the pavement is already completed are Cortez, Hancock, Milan, Prytania, Poydras, Lafayette, Dryades, Carondelet, Howard, Joseph, Sycamore, Hurst and Diana. Contracts now under way include the paving of Burgundy, the surfacing of Frenchmen between Gentilly and Milneburg, the paving of Frenchmen with asphalt between Claiborne and Marigny, the paving of Jackson Ave., between Annunciation and Tchoupitoulas, and the subsurface draining of the same avenue between Annunciation and Prytania. Hancock, Milan, Poydras, Dryades, Lafayette, Joseph, Carondelet, Hurst and Sycamore Sts. and St. Charles Ave. have been improved by installing subsurface drainage systems.

Public Road Improvement at Private Expense in New Hampshire

An example of public spirit evinced in a thoroughly practical manner is furnished by the road improvement work on what is known as the Glessner Farm at Bethlehem, New Hampshire. This farm is the property and the summer home of J. J. Glessner, of Chicago, Ill., and the work, several views of which are shown in the accompanying illustrations, comprise the improvement of a number of miles of highway adjacent to Mr. Glessner's property. These roads, though public highways, have been and are still being improved almost entirely at Mr. Glessner's expense.

The town of Bethlehem is one of the northern towns in Grafton County and lies on the western edge of the White Mountains. It has a resident population of about 1,200, but is a popular summer resort and during the summer and early fall has a much larger population. The principal thoroughfare, Main Street, extends about two miles in an easterly and westerly direction, passing through the villages of Bethlehem and Maplewood, in which there are large numbers of hotels. This road is also on the route to Bretton Woods, another well known White Mountain resort, and carries a heavy automobile traffic. The Glessner farm is situated on a hill between the villages of Bethlehem and Littleton and about a mile and a half from the former. A part of the work done by Mr. Glessner is on the main road referred to, and a part is on a branch road leading to Franconia.

For the most part, the work done by Mr. Glessner has consisted of regrading and straightening the existing roads, although in one or two instances a road has been entirely relocated. The work which is now in progress, and which is shown in two of the accompanying illustrations, consists of regrading a portion of the main road on a hill leading up to the Glessner farm from Bethlehem. On the lower portion of the hill, a fill having a maximum depth of 5 ft. 10 ins. is being built, and on the upper portion the crown of the hill will be cut to a maximum depth of 6 ft. This fill, like the many others made on the Glessner roads, as they are called, consists of large stones taken from the farm.

In the construction of these roads, no attempt has been made to provide expensive surfacings. A material known locally as "hardpan," which is a gravel well adapted for wearing surfaces, is used exclusively. The surfaces of all of the roads are at present in good condition, although, according to Mr. Glessner, they have not been dragged as thoroughly as they should have been during the past sea-



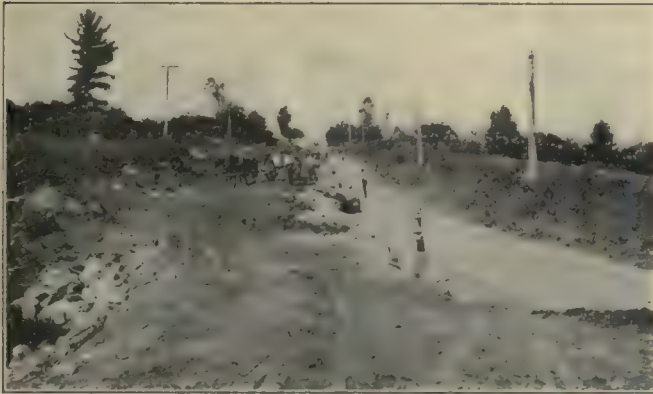
LOOKING TOWARDS BETHLEHEM-LITTLETON ROAD
FROM BRANCH ROAD TO GLESSNER FARM.

son. Mr. Glessner is a firm believer in the systematic and continuous use of the drag and it is his intention to keep the roads in condition by this means. During the present season, however, the demand for teams on other work has been so great that he has found it impossible to set aside a team for this purpose, as he hopes to do in the future. Along both sides of the roads which have been built stone walls have been constructed. These walls, which are shown in the accompanying illustrations of finished roads, are



NEAR VIEW OF APEX OF TRIANGULAR PLOT AT INTER-
SECTION OF MAIN ROAD AND ROAD TO FARM.

ing incident is of interest. Some time ago the town had at its disposal a certain amount of money which it desired to devote to the improvement of one of the roads near the Glessner property. The manner in which Mr. Glessner had performed his work had so favorably impressed the authorities that they proposed to him that he take the money which they had and build the road according to his own ideas. Mr Glessner consented to this arrangement on condition that he be allowed to build as



FILL UNDER CONSTRUCTION ON BETHLEHEM-LITTLE-
TON ROAD—EAST OF INTERSECTION SHOWN AT TOP.

built of stones cleared from the fields of the farm and are of a substantial and pleasing appearance. They are uniformly 4 ft. wide and 4 ft. high, extending about 3 ft. above the surface of the ground. The roads have been further beautified by the planting of shrubbery along the roadsides next to the walls.

All of this work has been done in the town of Bethlehem, and, as showing the esteem in which Mr. Glessner and his work are held by the town authorities, the follow-



NEAR VIEW OF FILL SHOWN IN ILLUSTRATION OPPO-
SITE—SHOWING CHARACTER OF MATERIAL USED.

much road as he desired, to make it of such width as he deemed proper and to build it in every way as he saw fit. He also offered to return any unexpended balance of the town's money after the completion of the work or to bear any additional expense over and above the amount placed at his disposal. This offer was accepted by the authorities and the road was built. Its cost is said to have been nearly double the amount paid by the town, the extra money having been paid by Mr. Glessner.



BETHLEHEM-LITTLETON ROAD—LOOKING WEST FROM
INTERSECTION SHOWN AT TOP OF PAGE.



BETHLEHEM-LITTLETON ROAD—LOOKING EAST TO-
WARDS INTERSECTION SHOWN AT TOP OF PAGE.

GOOD ROADS

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THE MAINTENANCE OF EARTH ROADS

When, in the course of an address delivered before the First American Congress of Road Builders, at Seattle, Washington, in 1909, A. W. Campbell, then Deputy Minister of Public Works of Ontario, Canada, made the statement that he had come to the conclusion that the principles of road making were three in number, and were: first, drainage, second, drainage, and, third, drainage, he made a statement which has since frequently been quoted and which expressed in a very striking manner the importance of providing in the original construction for properly draining a road. Had he gone further and stated that the principles of earth road maintenance were three in number, and were, first, dragging, second, dragging, and

third, dragging, he would have covered the two prime essentials of both construction and maintenance—in so far at least as they relate to roads of earth or certain kinds of gravel.

Another saying which, though perhaps not as striking as this—though it contains quite as much truth—is one quoted by S. Percy Hooker, State Superintendent of Highways of New Hampshire, in an address before the Board of Agriculture of that state at Hampton Beach, which was reported in our issue of Sept. 7. This was: "A good road is never built but always building," and it emphasizes a fact which has been repeatedly pointed out in these columns—that maintenance is a matter of the greatest importance and one to which attention must be given if we are to have good roads. Someone once said that as soon as we are born we begin to die, and the principle is equally as applicable to a road as to the human body. Almost as soon as the construction of a road has been completed, its maintenance should begin, though it is only too often the case that roads built at great cost are allowed to go to pieces in less than half the time which, with proper care, they could be expected to last.

While the importance of drainage provisions in construction, and of maintenance after construction, applies to roads of every description, it is especially true of roads of earth and gravel. At the present time so much attention is given to the construction of the so-called higher types of roads and pavements that there is more or less danger of forgetting the earth and gravel roads, which comprise by far the greater mileage of the country's road system. Although the ratio of macadam, brick, concrete and other improved roads to earth and gravel roads is constantly increasing, it will be many years before the roads of the latter types cease to be far in the majority. In the meantime, these roads must be used by an enormous traffic, and if the cost of transportation is to be kept within reasonable limits and communication made easy and pleasant they must be maintained in the best possible manner.

The earth or gravel road, when it is in good condition, is distinctly a good road. No road surface is ridden over with more pleasure than a smooth, thoroughly compacted earth or gravel road, just sufficiently moist to prevent dust. The trouble with such roads, however, is that the condition of the surface is unstable. Rains soften the roadbed, and travel acting upon the roads before they have dried out causes ruts and churns up the material into mud. Hot, dry weather produces dust, and the alternate freezing and thawing in the spring and fall further disturbs the surface. Although it is impossible to keep such roads always in first-class condition, they can be kept passable at practically all seasons and in a condition ranging from passable to excellent for a greater part of the year if proper maintenance methods are employed.

Much has been written concerning road drags and road hones. Almost everyone is familiar with the construction of these useful implements, and a realization of the results which can be obtained by their systematic use is becoming more widespread every day. This is, perhaps, especially true in the middle Western states, where soil conditions are such that the necessity for dragging is brought more forcibly to the attention than it is in other sections. Road drags and hones are of many kinds, differing in details but alike in principle. Very satisfactory implements may be made with the materials and tools at the disposal of every farmer, and there are numerous simple and inexpensive drags and hones on the market.

There is no doubt whatever but that a road machinery manufacturer having at his disposal a plant especially equipped for making such machinery can produce a properly designed and well made drag that will do better work and cost less in the end than a homemade drag. At pres-

ent, however, there seems to be, in some quarters at least, an idea that the homemade drag—the King drag, so called—is better adapted to the work than the more durable implements at present on the market. Probably this is due chiefly to the extensive publicity that has been given to the King drag and is merely one of those mistaken ideas which are apt to find general acceptance though having no real basis in fact. In that case, in the interest of both economy and efficiency, users of these implements should be educated to see that the investment of a little more money at first will prove economical in the end. If, unlikely as it seems, it is a fact that the commercial drags do not produce as good results as the others, there is an excellent opportunity for some manufacturer to find wherein the excellence of the homemade product lies and then bring out a drag that will be more effective as well as more economical.

BUILDING ROADS FOR SAFETY

On one or two previous occasions, it has been pointed out in these columns that one of the factors entering into the problem of modern road construction is that of providing for the safety of the road—that is, the building of the road in such a way as to throw every possible safeguard around its users.

Formerly, when the sole traffic to which country roads were subjected consisted of comparatively slow moving horse-drawn vehicles, bicyclists and pedestrians, little attention had to be paid to this problem. It sufficed, then, to erect guard rails where the road ran along the top of a slope, to build bridges strong enough to bear the traffic and erect proper railings upon them and to keep the grades down to those which could be safely traversed by horse-drawn vehicles. Alignment was of relatively small importance.

Present conditions, however, are very different. It is still necessary to provide guard rails, but they must be stronger than before. In like manner it is still necessary to make the bridges strong enough to bear the traffic, but the strength required now is greater than before. The requirements as to grade remain practically the same, since if grades are kept down as they should be for horse-drawn traffic they offer no great obstacle to the average motor car.

The greatest change is in regard to alignment. While sharp curves were permissible under former conditions, they are sources of danger at present. The driver of an automobile approaching a curve at a speed of over 15 miles an hour is in danger himself and is a source of danger to others, for, assuming that speed, two automobiles approaching a sharp curve from opposite directions travel toward each other at a speed of 30 miles an hour. On many of the curves existing on old roads throughout the country, especially in hilly regions, the curvature is sharp enough so that less than 100 ft. separates the two machines at the instant when the drivers first catch sight of each other, and, while accidents are being avoided under exactly these conditions every day, it is, nevertheless, a fact that danger always exists. When, as is often the case, the combined speeds of the two cars are such that they are coming together at a speed of more than 50 miles an hour the danger is very greatly increased, as it is also when the curve occurs on a hill. Aside from the peril in which the drivers of automobiles are placed, there is the even greater danger to horse-drawn traffic and, to a lesser extent, to pedestrians.

In view of these facts, it is essential that in the construction of roads the matter of safety be given very careful consideration and be provided for by the construction of guard rails of sufficient strength, the erection of ade-

quate bridges, the use of curves of as long radii as are practicable and, in addition, the cutting back of slopes and the removal of other obstructions on the inner sides of curves to a sufficient extent to enable the drivers of approaching vehicles to see the road for as long a distance in front of them as possible.

CONVENTION OF THE AMERICAN ROAD BUILDERS' ASSOCIATION

A meeting, which those in charge of the arrangements predict will be the greatest gathering of practical road builders of this or any previous year, will be held at Cincinnati, Ohio, on Tuesday, Wednesday, Thursday and Friday, December 3, 4, 5 and 6. As previously announced in these columns, the meeting will be the third American Good Roads Congress and ninth annual convention of the American Road Builders' Association.

Since its organization, a decade ago, this association has held eight conventions. Each of them has attracted large numbers of the foremost road builders of the country, and each convention since the first has been more successful from every point of view than those preceding it. At the Rochester convention last year there were present between 1,400 and 1,500—a record attendance for a meeting of its kind. What such a registration as this really meant is better understood when there is taken into account the character of those attending. The Rochester convention was, in every sense of the word, a practical and technical meeting, and although there was much in the program to interest the layman and although a few of those present were laymen, in a certain sense, yet the majority of the delegates and guests consisted of men actually engaged in the construction and maintenance of roads, either as administrative officials, engineers, contractors or dealers in material or machinery.

The preparation of the program of the Cincinnati convention has not yet been completed, but it has been announced that the proceedings will follow along the lines of last year's meeting and, as before, will cover the subjects bearing directly upon the practical questions of road construction and maintenance from the standpoint of the official, the engineer and the contractor. In order to avoid repetition in presenting the various topics, a carefully selected list of papers will be prepared and delivered, each by an authority on the particular subject dealt with. As last year, these formal papers will be few in number and the program will be so arranged as to group together related subjects and allow opportunity for discussion after the presentation of each formal paper. The personnel of the membership of the American Road Builders' Association guarantees the excellence of the papers, and the discussions, under the leadership of men known all over the country in road building circles, will be of inestimable value to anyone engaged in the work.

Three years ago at the Columbus convention, an exhibition of road machinery and materials was held in conjunction with the convention. This plan has been followed at each of the succeeding conventions and will be repeated at Cincinnati. In addition to the customary manufacturers' and dealers' displays, the exhibition this year will include exhibits by a number of states and municipalities. The applications for space already made, two months before the date of the opening of the convention, assure the success of this part of the meeting. Excellent facilities for displaying the exhibits have been provided in Music Hall, the same building in which the sessions of the convention will be held, and the spaces, both as regards extent and arrangement, will accommodate exhibitors in an even better manner than heretofore.

Governor Harmon of Ohio has sent letters to the governors of all the other states, giving them formal notification of the holding of the convention, commending the objects of the American Road Builders' Association, and requesting the appointment of official delegates. This official invitation has brought forth responses making clear the hearty indorsement of the chief executives of the several states.

Every effort is being made by the city of Cincinnati and by its citizens to cooperate with the association in the preparation of plans for the gathering, and it is predicted by officials of the association that the meeting will bring together a greater number of the real road builders of the country than ever before.

The Road Congress at Atlantic City

The joint congress of the American Association for Highway Improvement, the American Automobile Association, the National Association of Road Machinery and Material Manufacturers and the road organizations affiliated with the first-mentioned association, began in the Hippodrome on Young's Million Dollar Pier, Atlantic City, N. J., on Monday morning, Sept. 30. This meeting is the second road convention to be participated in by the American Association for Highway Improvement and the first joint convention of the three associations mentioned and the several affiliated organizations.

The American Association for Highway Improvement, the leading organization taking part in the congress, was formed at Washington, D. C., in November, 1910. The purposes for which it was formed, as set forth in its official publications, briefly stated, are: The correlation and harmonizing of the efforts of existing road improvement associations; the arousing and stimulating of sentiment for road improvement; the striving for wise, equitable and uniform road legislation in the various states; the aiding of efforts to bring about efficient road administration; the working for continuous and systematic maintenance of roads, the classification of roads according to traffic requirements, the payment of road taxes in cash and the adoption of the principle of state aid and state supervision; and, lastly, the advocating of the construction of roads in such manner as to form a connected system throughout the country. The first convention of the association was held in Richmond, Va., Nov. 20, 21, 22 and 23, 1911. The sessions were held in the auditorium of the Jefferson Hotel and were attended by about 700 delegates and guests. The four days of the convention were designated as "National Day," "Highway Engineers' and Contractors' Day," "Road Users' Day" and "Association Day," the topics taken up on each day being those indicated by the names. The officers of the association are: President, Logan Waller Page, Director, United States Office of Public Roads; Vice President, W. C. Brown, President, New York Central Lines; Treasurer, Lee McClung, Treasurer of the United States; Secretary and Editor, J. E. Pennybacker, Jr.; Field Secretary, Charles P. Light; Chairman, Board of Directors, James S. Harlan, Member, Interstate Commerce Commission; Chairman, Executive Committee, W. W. Finley, President, Southern Railway Co.

The American Automobile Association is a national organization of automobilists, with headquarters in New York City and affiliated associations in the various states. Its objects are, of course, the furtherance of the interests of automobilists, including the work of securing appropriations and legislation to provide for the extension of highway improvement. This association held a convention, which it designated as the First National Good Roads and Federal Aid Convention, at the Hotel Raleigh, Wash-

ington, D. C., on Jan. 6 and 7, of this year. The total registration at this meeting was 174. The officers of the association are as follows: President, Robert P. Hooper, Pennsylvania; First Vice President, Frank M. Joyce, Minnesota; Second Vice President, Laurens Enos, New York; Third Vice President, C. L. Bonifield, Ohio; Fourth Vice President, Ralph W. Smith, Colorado; Fifth Vice President, F. L. Baker, California; Secretary, John N. Brooks, Connecticut; Treasurer, H. A. Bonnell, New Jersey; Chairman of the Executive Committee, A. G. Batchelder, New York. Geo. C. Diehl, of Buffalo, N. Y., is Chairman of the Good Roads Board.

The National Association of Road Machinery and Material Manufacturers consists of individuals, firms and corporations engaged in the manufacture of machinery and materials used in the construction and maintenance of roads. It was formed at Richmond, Va., during the convention of the American Association for Highway Improvement. Its stated purposes are "to arrange for and manage exhibitions of such road material and machinery as are the products of its members; to protect and further the business and interests of its members; to develop the relations existing between them, and to facilitate the interchange of ideas for their mutual benefit." Its officers are: President, W. T. Beatty, of the Austin-Western Co., Ltd., Chicago, Ill.; Vice President, S. Jones Phillips, of the American Road Machine Co., Kennett Square, Pa.; Secretary and Treasurer, Daniel T. Pierce, of the Barber Asphalt Paving Co., New York City.

The associate road organizations cooperating in the Atlantic City meeting, according to the advance announcements of the congress, are as follows: Alabama Good Roads Association; Arkansas Good Roads and Drainage Association; Arizona Good Roads Association; Bristol-to-Washington Highway Association; Capital Highway Association; Central Highway Association; Good Roads Club of Georgia; Gulf Coast Good Roads Association; Illinois Highway Improvement Association; Indiana Good Roads Association; Inter-Mountain Good Roads Association; Iowa Good Roads Association; Memphis-to-Bristol Highway Association; Michigan Good Roads Association; Montana Society of Engineers; Montana Good Roads Congress; National Congress of Mothers; New Santa Fe Trail Association; North Carolina Good Roads Association; North Dakota Good Roads Association; Ohio Good Roads Federation; Old Trails Committee, D. A. R.; Omaha-Denver Good Roads Association; Oregon Association for Highway Improvement; Oregon Good Roads League; Quebec-Miami International Highway Association; South Carolina Good Roads Association; Southeastern Kentucky Good Roads Association; Southern Appalachian Good Roads Association; Virginia Road Builders' Association; Western Michigan Development Bureau; Wyoming Highways Association.

It was also announced that the American Bar Association would cooperate with the congress in the holding of a legislative section, and that the Society for the Promotion of Engineering Education would hold a special session at the congress to consider the subject of highway engineering instruction in educational institutions.

The program of the congress, as officially announced, provided that Monday, Sept. 30, and Tuesday, Oct. 1, would be under the direction of the American Automobile Association, while the remaining four days would be under the direction of the American Association for Highway Improvement. A synopsis of the program in detail follows:

Monday, September 30.

Morning Session—10 a. m.

Address of welcome by Governor Woodrow Wilson of New Jersey. Addresses by Professor Charles Thaddeus Terry of Columbia University of New York City, Chairman

of the Legislative Board of the American Automobile Association; W. E. Metzger, of the National Association of Automobile Manufacturers, and others.

Afternoon Session—2 p. m.

Geo. C. Diehl, Chairman of the Good Roads Board of the American Automobile Association, presiding. Addresses by Powell Evans, President of the Automobile Club of Philadelphia; H. L. Vail, of the Cleveland Automobile Club, and others.

Tuesday, October 1.

Morning Session—10 a. m.

Addresses by J. C. Scates, Westbrook, Me., Secretary-Treasurer of the Maine Automobile Association; Judge Lowe, of the National Old Trails Road Association, and others.

Afternoon Session—2 p. m.

Addresses by Dr. Jos. Hyde Pratt, State Geologist of North Carolina; S. S. Ballard, Secretary of the Automobile Club of Vermont; D. M. Potter, of the Ocean-to-Ocean Highway Association; Preston Belvin, President of the Virginia Automobile Association; Senator Walter E. Edge, of New Jersey; G. Grosvenor Dawe, Chief of the Editorial Division of the National Chamber of Commerce, and others.

Wednesday, October 2.

Morning Session—10 a. m.

Logan Waller Page presiding. Addresses by William Howard Taft, President of the United States; W. A. McLean, Provincial Engineer of Ontario, Canada; M. de Puligny, Chief of the French Mission of Engineers in the United States; Gen. P. V. De Graw, Fourth Assistant Postmaster-General of the United States; W. W. Finley, President of the Southern Railway Company, and others.

Afternoon Session—2 p. m.

(Legislative Section).

Presided over by a chairman selected by the American Bar Association and participated in by members of the American Bar Association, state bar associations, state legislatures, the Congress of the United States, and others.

Thursday, October 3.

Morning Session—10 a. m.

(Finance Section).

Lee McClung, Treasurer of the United States, presiding. Addresses by Mr. McClung; J. R. Marker, State Highway Commissioner of Ohio; Henry G. Shirley, Chief Engineer of the Maryland State Roads Commission, and others.

Afternoon Session—2 p. m.

(Administrative Section.)

Hon. Wm. C. Sproul, of Pennsylvania, presiding. Addresses by Gen. John C. Black, President of the United States Civil Service Commission; C. Gordon Reel, State Superintendent of Highways of New York State; James H. MacDonald, State Highway Commissioner of Connecticut; P. St. J. Wilson, State Highway Commissioner of Virginia.

(Economic Section).

Dr. Jos. Hyde Pratt, State Geologist of North Carolina, presiding. Addresses by Dr. Pratt; Professor E. Stagg Whitin, General Secretary of the National Committee on Prison Labor; Jesse Taylor, Secretary of the Ohio Good Roads Federation, and others.

Friday, October 4, and Saturday, October 5.

(Construction and Maintenance Section).

(At the time of going to press, no announcement had been made as to the times at which the sessions on these days would be held.)

The program, as announced, was as follows:

(Each Paper Will be Followed by Discussion.)

Special Paper—Road Construction under the U. S. War Department, by Col. Spencer Cosby, Corps of Engineers, U. S. A.

SUBSECTION A—LOCATION AND GRADES.

- Question 1.—Surveys—Prof. E. L. Griggs, University of Georgia. (One other to be announced.)
 " 2. New Location and Relocation—Wm. J. Roberts, State Highway Commissioner, Washington.
 " 3. Grades—tractive resistance of various surfaces—relation to traffic, etc.—Prof. E. B. McCormick, Kansas State Agricultural and Mechanical College.

SUBSECTION B—FOUNDATION AND DRAINAGE.

- Question 4. Fundamental Consideration—Prof. Thos. H. McDonald, Iowa State College.

SUBSECTION C—ROAD SURFACES.

- Question 5. Earth, Sand-Clay and Similar Materials—Qualities and Methods of Application—W. S. Keller, State Highway Engineer, Alabama.
 " 6. Gravel and Stone—Qualities, Test and Selection—Albert Goldbeck, Testing Engineer, U. S. Office of Public Roads.
 " 7. Bituminous Materials, including Tars, Asphalts and Oils—Qualities and Tests—Dr. A. S. Cushman, Director, Institute of Industrial Research.
 " 8. Construction of Gravel and Water Bound Macadam Surfaces—Austin B. Fletcher, State Highway Engineer, California.
 " 9. Construction of Surfaces with Bituminous Materials—A. H. Blanchard, Professor Highway Engineering, Columbia University, New York.
 " 10. Brick Roads—Materials, Construction and Maintenance—Theo. A. Randall, Secretary National Brick Manufacturers' Association.
 " 11. Concrete Roads—Materials, Construction and Maintenance—A. N. Johnson, State Highway Engineer of Illinois.
 " 12. Experimental and Special Surfaces Applicable under Special Conditions—William H. Connell, Chief Bureau of Highways of Philadelphia, Pennsylvania.

SUBSECTION D—MAINTENANCE. (Methods rather than Administrative System.)

- Question 13. Earth, Sand-Clay, Gravel Roads—Geo. W. Cooley, State Highway Engineer, Minnesota.
 " 14. Water Bound Macadam—James Owen, Consulting Engineer, Montclair, New Jersey.
 " 15. Bituminous Surfaces—Charles W. Ross, Superintendent of Streets, Newton, Massachusetts.

SUBSECTION E—BRIDGES.

- Question 16. Highway Bridges—Prof. William H. Burr, Columbia University, New York.
 " 16-A. Highway Culverts—W. S. Gearhart, State Engineer, Kansas.

SUBSECTION F—STREETS AND PARKS IN CITIES AND TOWNS.

- Question 17. Street Paving—Geo. W. Tillson, Consulting Engineer, Borough of Brooklyn, New York.
 " 18. Park Roads—Linn White, Engineer, South Park Commission, Chicago, Illinois.

SUBSECTION G—ADAPTATION OF SURFACES TO TRAFFIC REQUIREMENTS.

- Question 19. Paper (to be announced).

SUBSECTION H—ROADSIDES.

- Question 20. Paper—Glenn Brown, Secretary American Institute of Architects.

SUBSECTION I.

- Question 21. Road and Street Contracts (Essentials and Line of Improvement)—(To be announced.)
 " 22. The Relation of the Contractor to the Public Official—C. A. Crane, Secretary, The General Contractors' Association.

In connection with the congress an exhibition is held on the pier, in which are shown exhibits by the national government, state governments and by various manufacturers of and dealers in road machinery and material. The government exhibit, made by the United States Office of Public Roads, consists of two series of miniature models, one showing the development of road building from the early Roman roads to the types now in use and the other showing modern types such as sand-clay, gravel, water bound macadam, bituminous macadam, brick, concrete, etc. The exhibit also includes models of bridges, culverts, road rollers, rock crushers and the like. The state exhibits give information regarding the roads within the state.

The officers of the congress are as follows: Honorary President, the President of the United States; President, Logan Waller Page, Director of the United States Office of Public Roads; Treasurer, Lee McClung, Treasurer of the United States; Secretary, J. E. Pennybacker, Jr.; Director of Publicity, Thos. F. Logan; Assistant to President, Charles P. Light; Executive Committee: Logan Waller Page, President of the American Association for Highway Improvement; Geo. C. Diehl, Chairman of the Good Roads Board of the American Automobile Association, and Henry Fisher, Director of the National Association of Road Machinery and Material Manufacturers.

CORRESPONDENCE

The A. R. B. A. and the A. A. H. I.

Editor "Good Roads":

In reference to the letter regarding the Atlantic City convention, written by the president of the American Road Congress, Logan Waller Page, Director of the U. S. Office of Public Roads, which was published in your issue of September 21, I should like to state for your information, as well as for that of the public—if it is interested—that the statements made in my letter which you published in the issue of September 7 are neither "misleading" nor "erroneous."

It may be that the American Automobile Association and the National Association of Road Machinery and Material Manufacturers are not "affiliated bodies," but that either is taking a leading or independent part in the congress at Atlantic City is hardly to be believed if you observe that the president, treasurer, secretary and press agent of the American Association for Highway Improvement are also respectively president, treasurer, secretary and press agent of the congress. It should also be appreciated that these officers were elected by three members of the executive committee of the joint congress, one of whom was Mr. Page himself. I assume, therefore, that my use of the word "affiliated" was not so far wrong.

I repeat that Mr. Page stated to me, not once but many times, that the American Association for Highway Improvement was to confine its lines of usefulness strictly to the propaganda for good roads. To confirm this view he explained that the two associations having different purposes should live at harmony with each other and that the same men could, with perfect consistency, be members of both associations.

I believed that he was sincere in these statement and therefore readily accepted the invitation to preside one day at the congress at Richmond last fall.

I should like to correct the assumption made by Mr. Page that I contend that "the field of construction and maintenance is the exclusive property of the American Road Builders' Association," for I make no such contention. I do, however, think that no confusion should exist in the mind of the public as to what the facts in the case are, and that if one of these societies is to devote itself by common consent to one field of activity, the other should, for all reasons, keep within its own recognized limitations.

My letter was written to the public because I have found confusion existing, and how far the views I expressed are also yours is a matter that I profess to know no more of than I might have obtained from ordinary conversation. In conclusion I have only to add that I consider it questionable judgment for a public official, such as Mr. Page is, to exhibit personal feeling in a public communication.

HAROLD PARKER.

Worcester, Mass.

Use of the Right Angle Mirror on Road Surveys

Editor "Good Roads":

Those of us who are actively engaged in it know that highway surveying as it is now practiced needs a considerable degree of skill. It is not, of course, to be compared in that respect with the highest expression of the art demanded on first-class railroad work, but it has problems of its own that afford no mean field for the exercise of original and efficient methods.

For instance, in my own state the maps and plans that are required by the Highway Commissioner show more detail than would railroad plans, especially in the country. The fact that the improved highway is usually the old one straightened, graded and rebuilt, accounts for this. It is necessary that houses and other buildings, fences, driveways and barways, retaining walls, culverts, telephone and telegraph poles, often shade trees, and many other features that exist along an old road should be shown with tolerable accuracy on the plan on which the improved lay-out is later to be indicated. A large number of location measurements therefore have to be taken, and it is essential that the most expeditious methods should be employed in taking these measurements if the survey is to progress with a reasonable degree of celerity. To such end, after using the various other well known methods, the writer has recently had recourse to the simple instrument known as the right-angle mirror, which, though no new thing, is not employed to any large extent, so far as he is aware, by ordinary surveyors.

Of course, the obviously most simple way of locating an object is by an off-set at a right angle and a measurement from the transit line. When the distance is only a few feet it is practicable to make the off-set by the eye alone, but for

longer distances even a trained eye is often seriously inaccurate. It is in such cases that the mirror is a help and a time-saver. If the member of the party using the mirror is kept in the line either by the instrument man, or by himself with the aid of a couple of ranging poles set in the line, he can locate, with a fair degree of precision, the point on the transit line at which a line perpendicular to the transit line will pass through the object he is locating, even when the object is at a considerable distance from the line. A measurement then to ascertain the station number of that point on the line and another from it to the object being located, are quickly made by the tape men and quickly noted by the recorder with a small amount of sketching. Not only, therefore, is the method an advantageous one for use in the field, but it is a very simple and easy one for the draftsman to work from; in fact, more time is probably saved in the office than in the field by its use.

The manner of handling this useful little auxiliary to the surveyor's outfit is perhaps too simple to call for any explanation. I, myself, use the instrument listed as No. 5750 in Keuffel & Esser's catalogue. With the instrument held as closely as possible in the line before the eye of the observer it is at the required point when the object to be located is seen in the mirror directly under the ranging pole set on the line and seen through the open space above the mirror. The operation is so easy that usually any member of the party can be assigned to it but it is one of the little things that tell in the day's work.

HIGHWAY SURVEYOR.

Winsted, Conn.

The Road Machine

Editor "Good Roads":

In your issue of Sept. 7, 1912, in an article making reference to an address by Mr. S. Percy Hooker relating to town road work in New Hampshire, you say this: "The inefficient and even careless methods attributed by Mr. Hooker to some New Hampshire towns are as prevalent elsewhere. Why it should be so is somewhat difficult to understand."

I think I could furnish enlightenment on the matter. As boy and man I have been familiar with road work and road conditions in rural Maine for fifty years; was the first man in Maine to use a road drag; served as road commissioner in my town (Standish) from 1907 to 1911, both inclusive; had charge of 35 miles of highway, and produced, as one enthusiastic automobilist from New York told Dr. Marshall of Portland, "the finest roads in New England."

Now, not one dollar was used in operating the road machine. Every dime we have for the care of our earth roads can be expended to better advantage by other methods. I have seen too much damage wrought by its use to defend it at all. Call it "use" or "abuse" or what you will, I can not call to mind one single rod of highway but has been injured by its use. The best sections are where it has been used the least, and I can give, with abundance, good and sufficient reasons for the faith that is in me.

F. P. SANBORN.

Buxton, Me.

Platte River Roads and Bridges

Editor "Good Roads":

The Platte River, from North Platte east will average from 4,000 to 5,000 ft. wide. Lincoln County has three bridges, Dawson has five, Buffalo four and so on east, down the river.

It has been a great burden to maintain these bridges, and often the river is low or dry and most of the bridges span sand bars in place of a stream. I have advocated for the past five years the filling of all the channel, except 1,200 feet, with a sand fill carrying a roadway of dirt and gravel on top.

Two years ago Dawson County took the matter in hand and built a new bridge at Gothenburg, building 1,700 feet of bridge and 2,200 feet of sand fill 6 ft. 6 ins. high, then covered this fill with one foot of earth for a wearing surface or roadway. This fill was ripped with concrete for 450 ft. from the bridge ends towards the shore for the full height of the fill. River sand was used for the concrete, there being no stone available for riprap. In this case the county saved \$10,000 on the original cost and the maintenance cost of keeping 2,200 feet of earth road in repair against 2,200 feet of bridge.

Buffalo County has taken the matter up and has 1,500 ft. of bridge replaced by a sand fill and 1,100 ft. more of fill under contract at the Elm Creek bridge, leaving 1,200 feet of bridge to keep in repair. In this case a brush mattress was first placed on the river bed and then the concrete riprap was placed on top of the brush mattress.

The state and the western counties are now bridging the North Platte river by building 800 ft. of bridge and filling the

balance of the channel with a sand fill, with a dirt and gravel roadway.

The greatest flood known in the Platte is 50,000 cu. ft. per second. At a flow of 5 ft. per second a channel 1,200 ft. wide will run 8 ft. 4 ins. deep, which is not deep for a flooded river. There is a railway bridge 1,700 ft. long that has carried these floods for twenty years, the country not having been flooded above it.

There surely are other streams like the Platte, such as the Arkansas, that can be confined in this way, brush being the best riprap below water and stone above the low water line.

Kearney, Neb.

C. A. EDWARDS, C. E.

Tractive Resistance

Editor "Good Roads":

May I ask you to publish in "Good Roads" a table showing the power necessary to move a certain load over different kinds of roads, from a level grade to a grade too heavy for general traffic?

C. B. MOSS,

Deputy County Engineer of Spokane County.

Spokane, Wash.

The following table taken from Baker's "Roads and Pavements" shows the effect of grade upon the load a horse can draw on different roads, the load being given in terms of the weight of the horse. This table is computed from the equation

$$L = \frac{t - g}{u + g} W$$

in which L equals the load, u equals the coefficient of road resistance, W equals the weight of the horse, g equals the per cent. of grade, and t equals the tractive power on a grade in per cent. of the weight of the horse, t in the computation of this table being taken as one-tenth the weight of the horse.

Rate of Grade, per cent	Iron Rails.			Sheet Asphalt.			Broken Stone.			Stone Block.			Earth Road.		
	u =	1	200	u =	1	100	u =	1	60	u =	1	50	u =	1	33
0	20.00	10.00	6.00	5.00	3.00	2.00	1.00	0.91	0.83	0.75	0.60	0.50	0.43	0.36	0.33
1	6.00	4.50	3.33	3.00	2.09	1.50	0.91	0.83	0.75	0.60	0.50	0.43	0.36	0.33	0.25
2	3.20	2.67	2.16	2.00	1.51	1.14	0.67	0.62	0.57	0.52	0.40	0.33	0.29	0.25	0.18
3	2.00	1.75	1.49	1.40	1.11	0.87	0.54	0.82	0.75	0.71	0.50	0.43	0.36	0.33	0.25
4	1.33	1.20	1.05	1.00	0.82	0.66	0.43	0.75	0.71	0.67	0.50	0.43	0.36	0.33	0.25
5	0.91	0.83	0.75	0.71	0.60	0.50	0.43	0.62	0.57	0.52	0.40	0.33	0.29	0.25	0.18
6	0.62	0.57	0.52	0.50	0.43	0.36	0.25	0.57	0.52	0.48	0.33	0.29	0.25	0.21	0.11
7	0.40	0.38	0.34	0.33	0.29	0.25	0.18	0.40	0.38	0.34	0.20	0.18	0.15	0.11	0.05
8	0.24	0.22	0.21	0.20	0.18	0.15	0.11	0.33	0.30	0.27	0.10	0.08	0.07	0.05	0.00
9	0.15	0.10	0.09	0.09	0.08	0.07	0.05	0.20	0.18	0.15	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

The most complete discussion of this subject of tractive resistance given in any of the text books will be found in "Roads and Pavements" on pages 21 to 35, inclusive. Besides the table given here, there are included several other tables giving the tractive resistance of various vehicles on various roads at different grades and showing the influence of tire width, size of wheels and other factors on tractive resistance. One table shows the standard tractive resistance of different kinds of roads. This is as follows:

Kind of road surface.	Tractive Resistance.	
	Pounds per ton.	In terms of load.
Asphalt—artificial sheet	30—70	1/67—1/30
Brick	15—40	1/133—1/50
Cobble stones	50—100	1/40—1/20
Earth roads—ordinary condition	50—200	1/40—1/20
Gravel roads	50—100	1/40—1/20
Macadam	20—100	1/100—1/20
Plank road	30—50	1/67—1/40
Sand—ordinary condition	100—200	1/20—1/10
Stone block	30—80	1/67—1/25
Steel wheelway	15—40	1/133—1/50
Wood block—rectangular	30—50	1/67—1/40
Wood block—cylindrical	40—80	1/50—1/25

Asphalt Production During 1911, and Cuban Deposits

The increased production of asphaltic materials in 1911 according to a bulletin of the United States Geological Survey, resulted principally from the movement for better roads throughout the United States.

In 1910 the production of hard forms of asphalt such as

ultrahite or gilsonite, elaterite, etc., in Utah was 29,832 tons, valued at \$372,900. In 1911 it amounted to 35,846 tons, valued at \$531,614. The production of asphalt residuum from petroleum in California, Texas, Illinois and the mid-continent field increased from 159,424 tons, valued at \$2,207,937, in 1910, to 234,951 tons, valued at \$2,684,230, in 1911.

The principal foreign sources of asphalt changed little in output during 1911, it is stated. The bulletin also reports that importations from Trinidad to the United States are being replaced to a considerable extent by the importation of asphalt from Bermudez, Venezuela. In Mexico, it is said, attention has been temporarily diverted from working the large asphalt deposits to the search for petroleum, and as a result activity in asphalt production has been limited to supplying Mexican cities with paving and roofing asphalt obtained as a residuum from the oil refineries at Tampico and Minatitlan.

Mention is made in the bulletin of several reports on Cuban mineral industries made to the War Department, in which references have been made to the numerous localities, usually in the eastern half of the island, where asphalts of various grades are known to occur. It is also well known, according to the bulletin, that Sr. Torrentegui, a citizen of Cardenas, mined hard asphalt in Cardenas harbor, especially in the shoal water near the north end of Key Cupey. His attempts to carry on operations on a large scale were unsuccessful, however, because the caissons he tried to drive into the asphalt were wrecked by stones. It was necessary for him, therefore, to depend on such crude methods as breaking up the asphalt on the bottom with long drills or crowbars and then bringing it up with grappling tongs.

Although this industry came to an end with Torrentegui's death, hard asphalt has also been mined at Menendez, on the northern seacoast east of Cardenas, and at the Jatibonica mines, in the mountains north of the railroad station of the same name, although the development there was suspended on account of litigation.

The character of the hard asphalt is well shown, according to the bulletin, near Placetas del Sur, where there have been developed several nearly vertical veins varying in width from 2 to 8 ft. These veins are of decomposed serpentine, one wall being usually very smooth and the other more irregular. They run at various angles to one another, no regularity being evident as in the gilsonite veins of Utah. At the outcrops, it is stated, this asphalt is generally very friable and like coke, but further down it is quite compact, of a glossy black, and with a distinct odor of oil. The glossy black material is readily soluble in benzol and spirits of turpentine, while the coke-like material is less easily dissolved.

In many other places, it is stated, liquid and semiliquid asphalts have been discovered, especially at Sabanilla, east of Cardenas, and near Minas, 20 miles northeast of the town of Camaguey.

Road Bonds in Texas

There were four road bonds elections held in Texas during the month of August, three of which carried. The total bonds voted amounted to \$300,000. One hundred thousand dollars was voted in Ellis County, August 10, and \$100,000 on August 17. In Lamar County \$100,000 was voted August 17, and a proposition for \$150,000 was defeated in El Paso County, August 27.

Elections have been called in three counties during September and October. The total bonds to be voted upon during these two months as reported to date are \$625,000. In six other counties petitions for elections on bond propositions, amounting to \$515,000, have been filed.



CONCRETE CULVERT CARRYING THE "APPLE WAY" ACROSS AN IRRIGATION DITCH—SHOWING TYPICAL CULVERT CONSTRUCTION IN SPOKANE COUNTY, WASHINGTON.

Road and Bridge Work in Spokane County, Washington

Two examples of what is being accomplished in road improvement in Spokane County, Washington, are shown in the accompanying illustrations, which were furnished by the Spokane County Good Roads Association.

The illustration at the top shows a concrete culvert, which is typical of the structures being used in the Spokane County work. This particular culvert bridges an irrigation ditch and is situated on what is known as the

Apple Way. This is a 15-mile water bound gravel macadam road, 30 ft. wide, extending from the city of Spokane easterly to the western border of the state of Idaho.

The illustration at the bottom shows a portion of Sunset Boulevard. The section shown is surfaced with asphaltic concrete 16 ft. wide, with 4-ft. shoulders on the sides. The rock cut beyond the fill was made through solid basaltic rock, the material excavated being used in making the fill. The slope of the embankment is protected by riprap placed by hand.



A PORTION OF SUNSET BOULEVARD, SPOKANE COUNTY, WASHINGTON—SLOPES OF FILL IN FOREGROUND RIPRAPPED WITH STONE FROM CUT IN BACKGROUND.

Portable Drilling Outfit Used in Street Work

Besides large work properly classed as rock excavation, for which a more or less permanent plant is required, road and street work frequently includes the removal of considerable quantities of rock. This may occur in grading, in the excavation of trenches for pipes of various kinds and in a part of the work of getting out road metal in quarries.

In such work the quantity of rock to be gotten out in any particular place is apt to be small, although the total amount, scattered over a considerable distance, may be comparatively large. Under these conditions it would seldom be economical or convenient to install a fixed central plant with the necessary piping, and resort must be had to hand drilling or to the use of a portable drilling outfit comprising a compressor, an engine to drive it and air hose and drills. Various outfits of this kind have been devised and two of them, identical in character but employed in different kinds of work, are shown in the accompanying illustrations.

The illustration at the left shows an outfit owned by the Water Department of Manchester, N. H., being used in the excavation of trenches in a road for the extension of water mains. This work was done during the present year and,



PORTABLE DRILLING OUTFIT OWNED BY THE CITY OF MANCHESTER, N. H., IN USE IN STREET WORK.

according to the estimate of H. H. Mendell, Supt. of the Water Works, of Manchester, a saving of from 65 to 75 per cent. over the cost of hand drilling was effected by the use of the portable outfit.

In the other illustration is shown another outfit, owned by the city of Newton, Mass., in use in a trap rock quarry, also owned by the city. The stone obtained from the quarry is used for road metal, and the drill outfit besides being used for this purpose is also employed by both the Street Department and the Sewer Department.

In working the quarry the ledge is drilled with 3 1/2-in. steam drills on tripods and then blasted down. After a shot has been fired the portable outfit is hauled into the quarry and the larger fragments of stone block-holed with the hammer drills, as shown in the illustration. Before the portable outfit was used, this was done by 2-in. tripod drills, and it is stated that one of the Sullivan "DB-19" hammer drills does the work formerly done by two of the 2-in. reciprocating type tripod drills and requires less than half as much power.

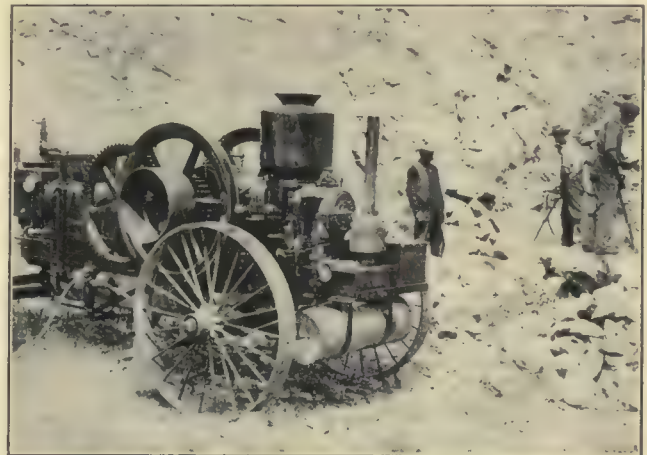
The outfit used in both cities consists of a Sullivan class "WK-3" portable air compressor, driven by a 15 HP. gasoline engine, mounted on a truck and equipped with air hose and drills. The truck is of structural steel and carries the gasoline tank, air receiver and cooling water receptacles, making the outfit complete and independent. The outfit

is 11 ft. 6 ins. long, without the pole, and weighs about 6,000 lbs.

The compressor is a Sullivan horizontal, single cylinder, double acting compressor of the center crank type, displacing 92 cu. ft. of free air per minute at 160 r. p. m. The air cylinder is fitted with poppet intake and discharge valves and is cooled by a water jacket consisting of a hopper open at the top and surrounding the cylinder. An unloading device, whereby the load may be automatically thrown on and off the machine as the demand for air varies, is attached to the compressor valves.

The compressor is gear driven by a 15 HP., single cylinder, four cycle gasoline engine. The ignition is of the jump spark type, produced by an automobile pattern spark plug. The cylinder is cooled by the evaporation of water from a cast iron hopper, and a "hit and miss" governor is employed. The gasoline tank and air receiver are suspended underneath the truck, and a tank holding compressed air for starting the engine at the beginning of a day's work is also hung under the truck body at the rear end.

The drills are of the regular Sullivan hand feed pattern, equipped with push handle throttles that remain open so long as the operator presses down on the handle. An ex-



PORTABLE DRILLING OUTFIT OWNED BY THE CITY OF NEWTON, MASS., IN USE IN CITY TRAP ROCK QUARRY.

haust valve permits the operator to control the amount of air deflected into the hollow drill to clean the hole.

The average gasoline supply required for a 9-hour day, running two drills, is given as about 15 gals. The crew required, it is stated, consists of a blacksmith and helper, and two drill runners and a helper. The blacksmith and helper devote about one-half of their time to sharpening drills, giving the remainder of their time to other work.

The outfit is of a new design and is manufactured by the Sullivan Machinery Co., of Chicago, Ill.

Severe Test of a Paved Road

One of the severest tests of short duration to which a paved roadway can be subjected is submersion under swiftly flowing water. The illustrations on the following page show a Warrenite road in King County, Washington, during and after such a test.

The road shown is a portion of the Pacific Highway and is situated between Kent and Orillia. The flood lasted three days, from Nov. 19 to Nov. 21, 1911, and for a period of 72 hrs. the road was covered with water which, in places, flowed very swiftly. The illustration at the top is from a photograph taken Nov. 20 when the flood was at its height and shows the road at a point where the current was very swift. The other was taken on Nov. 25, after the water had receded and shows the effects of the flood.



PACIFIC HIGHWAY, BETWEEN KENT AND ORILLIA,
WASH. PHOTOGRAPHED NOV. 20, 1911.

It will be noticed that the macadam shoulders are badly washed, in fact, have almost disappeared, while the paved surface remains unharmed.

The Warrenite road, with which most of our readers are undoubtedly familiar, is a bituminous concrete pavement laid under patents owned by Warren Bros. Co. It consists of a graded stone aggregate, heated and mixed with a bituminous cement, laid while hot, and then rolled. Like other pavements of a similar nature, it may be laid on old macadam, broken stone, concrete and similar foundations. The pavement is put down by contractors under the specifications of the manufacturers, the material, ready to lay, being furnished by the latter from plants located near the work.

Warrenite was brought out by the Warren Bros. Co. during 1909 as the result of experiments made to devise a pavement similar to bitulithic but low enough in cost to make it available for country roads, where the more expensive pavement could not be laid. During 1909 the company spent considerable time in devising a portable heating and mixing plant suitable for the work, and in the fall of that year constructed several sections of the roadway at various places. During 1911 it was used to a considerable extent, the total amount laid prior to 1912 being 474,144 sq. yds., which is equivalent to 50.5 miles of 16-ft. roadway. During the first eight months of the present year, contracts were awarded for 762,363 sq. yds., or 81 miles, of this pavement. Of this amount, 391,540



PACIFIC HIGHWAY, BETWEEN KENT AND ORILLIA,
WASH. PHOTOGRAPHED NOV. 25, 1911.

sq. yds. were laid in Pennsylvania, this figure including 262,149 sq. yds. in Allegheny County. In the state of New York, bids have been made for two large contracts, though at the time of writing the contracts have not been awarded. This work consists of 124,200 sq. yds. on the Bayshore-Brookhaven road in Suffolk County, and 112,300 sq. yds. on the Smithtown-Port Jefferson road, in the same county.

New Wood and Bitumen Pavement

Plans have recently been completed for putting on the market a new pavement, the wearing surface of which is composed of the fibers of hard wood impregnated and bound with a bituminous material. Experiments with the materials have been conducted for the past year and a half, and two experimental pavements have been laid, one at St. Albans, W. Va., and one at Wilmington, Del.

The wood fiber employed consists of chips of hard wood, varying in size from $\frac{1}{2}$ cu. in. down, and including dust. These are a by-product of the manufacture of tannin and other essences and are the residue left after the softer portions have been extracted from chips ground from chestnut, oak and other hard woods. According to a formal statement submitted by the inventor of the pavement and the process of manufacturing the material, there are 32 companies operating 57 plants at which this material is obtained. The total output is said to amount to about 5,000 tons a day, and has been regarded as practically waste, and utilized as fuel.

In preparing the material for the construction of Fibred-Asphalt pavement, as it is called, the fiber is taken from the vats of the extract companies by means of belt conveyors to vacuum driers installed at the plants. After the water has been thoroughly removed in the driers the material is carried to a series of screens of various meshes, separated into different sizes, and the particles that are too large returned for regrinding. The different sizes are then mixed in predetermined proportions, producing a graded aggregate which is compressed into bales with waterproof wrappings for transportation to the places where it is to be used.

The material, either in the form of a sheet or in the form of blocks, may be laid on a variety of different bases, such as worn macadam, old brick or stone block pavements, concrete foundations or thoroughly compacted earth. It is necessary that the base be firm and solid, but not necessarily smooth. In fact, better results are secured, it is claimed, when the surface is slightly rough, since this produces a better bond between the foundation and the surface. The foundation, of whatever nature, is swept clean of dust and should be thoroughly dry before the surfacing is applied. After sweeping, it is painted with hot pitch, which may safely be allowed to cool before the spreading of the wearing surface, since the hot mixture will soften it sufficiently to insure a bond between the wearing surface and the foundation.

After the preparation of the foundation, the previously dried fiber is placed in a special portable heating and mixing machine, and after being thoroughly heated is mixed with melted pitch. After the fiber is filled with the pitch asphalt is added and mixing continued. The material is then allowed to run out at the rear of the mixer in a sheet approximately 5 ins. thick, the material being soft enough to permit raking and shaping, where necessary, by hand.

After the necessary raking it is tamped with light wooden tampers, which have been dipped in water to prevent picking up the material. It is then rolled with a light roller weighing about one ton, the wheels of the roller being constantly dampened to prevent picking. Immediately after rolling, the surface is sprinkled with fine dust screenings of the fiber, and the mass is then rolled

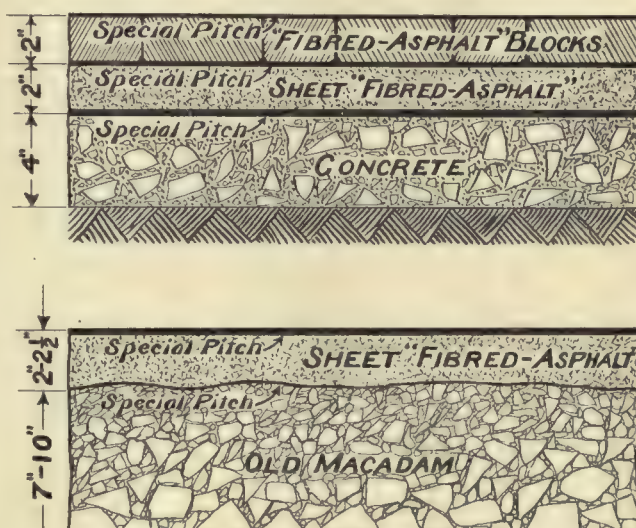
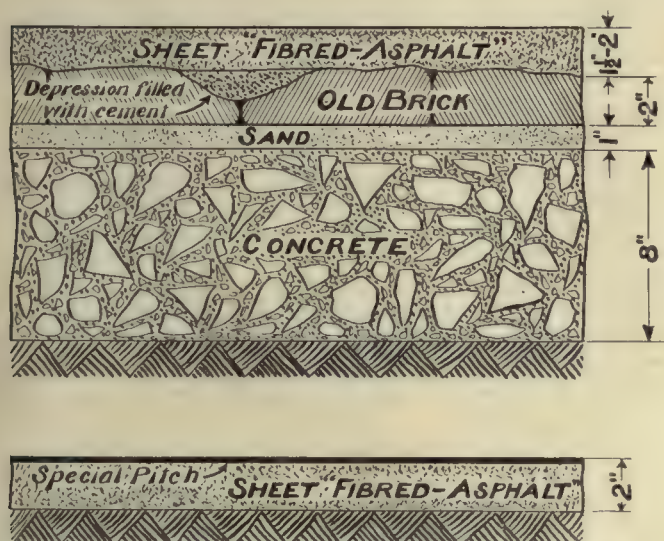
with a 5-ton and then with a 10-ton roller, the rolling being continued for about half an hour, the exact time depending upon the temperature, until the roadway has thoroughly cooled. After this the top may be painted with a mixture of asphalt and pitch, and, if a road of a light color is desired, sand spread over the surface.

The experimental road laid at St. Albans, W. Va., to which previous reference has been made, was put down during July and August, 1911. This road was divided into several sections, a different construction being used on each. In one a wearing surface consisting of "fibred-asphalt" was laid in a sheet varying from $1\frac{1}{2}$ to 2 ins., the variations being due to the unevenness of the surface of the old brick pavement which was used for the base. This brick pavement was laid on a 1-in. sand cushion on an 8-in. concrete foundation. The "fibred-asphalt" wearing surface was laid up to the curbs and to a depth of about $1\frac{3}{4}$ ins. over the gutters, the curb and gutter being of the combined form. On another section the wearing surface consisted of "fibred-asphalt" blocks, 2 ins. in thickness, laid on a 2-in. sheet of "fibred-asphalt" resting upon a 4-in. concrete foundation. In this section, three paint courses of special

April of this year. It was reported on July 24 that this section was standing up very well and was, in fact, in better condition than when first put down.

The advantages claimed for this pavement are cheapness, durability, ease of cleaning, low resistance to traffic, non-slipperiness, ease of maintenance, ease of travel and unusual sanitary qualities. The claims for durability are based both upon the nature of the materials used and upon the manner in which they are prepared and mixed. The wood fiber is claimed to be especially durable because it consists of only the hardest portions of the wood. It is further claimed that the shape of the fibers results in a mechanical interlocking which, aside from the action of the binder, adds greatly to the wearing qualities of the pavement. It is also claimed that the dried, heated fibres are thoroughly impregnated with bitumen, which is forced into the pores of the wood so that not only is the original density restored, but the wood itself is effectually preserved.

In regard to the cost, it is stated that the material, f. o. b. cars, will not cost more than 42 cts. per sq. yd. of finished road, this figure including the cost of pitch and as-



TYPICAL SECTIONS ON ST. ALBANS ROAD—TOP, LEFT, SHEET ON OLD BRICK; RIGHT, BLOCKS ON SHEET ON CONCRETE; BOTTOM, LEFT, SHEET ON EARTH, RIGHT, SHEET ON OLD MACADAM.

pitch were employed, one between the concrete foundation and the course of sheet "fibred-asphalt," one between this course and the blocks forming the wearing surface, and the third on the surface of the blocks. On another section, the wearing surface consisted of a sheet of "fibred-asphalt" from 2 ins. to $2\frac{1}{2}$ ins. thick resting upon an old macadam foundation. On this section there were no curbs, and the wearing surface was supported at the edges by earth shoulders. Two paint courses of special pitch were used in this, one between the old macadam foundation and the wearing surface, and the other on the surface of the road. On another section a 2-in. sheet of "fibred-asphalt" was laid directly upon the rolled earth subgrade and was supported at the sides by earth shoulders. A paint course of special pitch was used upon the surface of the road.

These sections have been under traffic for over a year, and, according to recent reports, have developed no depressions during hot weather nor any cracks during the winter or the following summer.

The other section of "Fibred-Asphalt pavement" referred to, was put down by the engineers of the Coleman Du Pont road on Tatnall Street, Wilmington, Del., in

phalt. The special machine for heating and mixing the material, running over the prepared base under its own power and discharging the mixed material at the rear, has a capacity of 2,000 sq. yds. of 2-in. pavement per 10-hour day. The cost of this machine is \$2,500. It is also stated that contractors can lay the pavement 2 ins. thick at a cost not exceeding 60 cts. per sq. yd., including royalties, labor and all charges.

The pavement is the invention of Geo. A. Henderson, of St. Albans, W. Va., and is covered by patent claims filed April 8, 1911, and allowed March 13, 1912. The claims cover the composition of the material, the method of drying the wood particles, the method of manufacturing articles from wood particles so treated, the method of manufacturing the composition from wood particles treated as specified, and the composition itself as a new article of manufacture.

The material is manufactured by the Fibred-Asphalt Co., Incorporated, of St. Albans. According to the formal statement of the company, its policy will be to take no contracts itself, but to furnish the material and the machine for laying it, to contractors, who will lay the pavement under a royalty arrangement.

Coming Meetings

Sept. 30—Oct. 5.—American Road Congress.—First Annual Session, Million Dollar Pier, Atlantic City, N. J., Secy., J. E. Pennybacker, Colorado Bldg., Washington, D. C.

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

A new city asphalt plant has been installed in Ft. Wayne, Ind.

King County, Wash., is preparing to expend about \$3,000,000 in improving county roads.

The City Council of Corpus Christi, Tex., recently awarded a contract to the Texas Bitulithic Co. of Dallas for the construction of 149,000 sq. yds. of street paving, comprising 150 blocks. This contract will involve the expenditure of about half a million dollars on Corpus Christi streets within the next few months.

According to a statement made by E. C. Dunn, City Engineer of Alexandria, Va., \$300,000 has been expended on street improvements during the last ten years. The statement was made by Mr. Dunn while testifying in the suit whereby the city of Alexandria is seeking to annex 366 acres of Alexandria County and 630 acres of Fairfax County.

A petition is being circulated in Yellow Medicine County, Minn., asking the State Highway Commission for a state highway east and west through the center of the county. The petition provides for 25 miles of road, which will become eventually a part of the projected highway from the western part of the state to the twin cities.

Hetherington & Berner of Indianapolis, Ind., have received the contract for the erection of a municipal asphalt plant in Camden, N. J. It will be erected on city property in the vicinity of 12th and Federal St., and will cost \$11,375. When the plant is finished the city will be in a position to do all asphaltting of streets and resurfacing and repaving.

Bonds to the amount of \$400,000 for the construction of permanent roads in the Fairmont District of West Virginia were voted at a special election held September 21. The issue carried by a vote of more than three to one.

The Board of Freeholders of Cape May County, N. J., has decided to advertise for bids for the building of the county's section of the Ocean Turnpike running from Ocean City to Marmora. It will have a 40 ft. roadway and be 5 ft. above high tide water.

Broadway, Springfield, Mass., has been declared a public street between Worthington and Vernon Streets. The grade has been established and in 90 days it will be opened to the public, except for a short distance between Bridge Street and Wight Ave., which the Water Department will continue to occupy until next spring.

Work has been commenced on the widening of Marietta St., in Atlanta, Ga. The work, when completed, will result in a street 60 ft. wide from the business center to the bridge at the stock yards. Wood blocks on a concrete foundation will be used as far as North Ave. From there to the bridge the pavement will be bitulithic, and, between the bridge and the city limits macadam will be laid. Eighty convicts are engaged in the work of improvement.

The Board of Supervisors of Genesee County, Mich., has voted to issue about \$100,000 worth of bonds to secure money for building good roads next year. Thirty miles of roads have been completed this year, and it is planned to add 92 miles next year at a cost of \$250,000. The county will eventually spend \$500,000 for roads. The action of the board in this instance was taken in order that the fund might not be depleted.

The taxpayers of a number of counties and precincts of Texas are petitioning their respective commissioners courts to call elections to vote upon the proposition of issuing road bonds in large amounts. It is proposed to issue \$300,000 of these bonds in Harris County, \$120,000 in Wood County, \$25,000 in Refugio County, \$10,000 in Hamilton County, \$20,000 in Orange County, \$40,000 in Medina County and \$150,000 in Webb County. An election has been authorized to be held in Frio County on December 7 to vote upon the proposition of issuing \$80,000 in road bonds.

The Cuban Government is endeavoring to devise means to continue the work of paving and sewerage the city of Havana. The allotment of ten per cent. of the custom's receipts are barely sufficient to meet more than one-third of the monthly account, which averages \$425,000, and it is proposed that part of the cost of the work be imposed upon the city of Havana. It is said that the city authorities object to this arrangement.

Ralph Modjeski, bridge engineer, of Chicago, has prepared plans for the construction of the proposed bridge on the Pacific Highway over the Columbia River between Oregon and Vancouver. According to his plans the structure will be made up of nine spans, each 320 ft. in length, and a draw span with two openings, each 200 ft. wide. The bridge is to connect Patton Ave. on the Oregon side with Washington St. on the Vancouver side. It is proposed to make the roadway 36 ft. wide between curbs, and the total cost has been estimated by Mr. Modjeski as \$1,987,200, exclusive of the cost of building permanent approaches at the ends.

The Board of Aldermen of Providence, R. I., has adopted a resolution providing for borrowing \$75,000 to pay the expenses of the city's agreement with the N. Y., N. H. & H. R. R. Co. to abolish the Plainfield St. and Hartford Ave. grade crossings. The agreement calls for the abandonment of portions of certain streets and the laying out and building of certain new streets. It also provides for the condemnation of the land necessary for carrying out the improvements by the railroad company and the city jointly. The railroad company will pay three-quarters and the city one-quarter of the total cost.

Personal Notes

Alexander Blair has been appointed City Engineer of Summit, N. J., in place of John Stiger, who has resigned.

George H. Nye has been elected City Engineer of New Bedford, Mass., succeeding Wm. F. Williams, who recently resigned.

Samuel C. Stephens, City Engineer of Easton, Pa., has resigned. His successor will be elected by the City Council some time in October.

George E. Kessler, a landscape architect of Kansas City, Mo., has been re-engaged for another year to carry on the work of preparing a boulevard and enlarged park system for South Bend, Ind.

CONTRACT NEWS

Contracts Pending
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10-7	Fresno, Cal., road oiling mach.	9-28
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10-15	Milton, Fla., bridge bonds	10-5
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ROADS AND STREETS

Bids Asked and Prospective Work.

Little Rock, Ark.—Commissioners for Street Improvement District No. 176 desire proposals for grading and paving the several streets within their district. In all about 14,000 sq. yds. Plans and specifications for the work can be seen at the office of the engineer, E. A. Kingsley, corner of Markham and Center Sts., Little Rock, Ark. Sealed bids will be received by the secretary of the Board at his office or by the secretary at the office of the engineer at 3 p. m., October 8, 1912.

Coalinga, Cal.—The City Council has ordered the paving of 3½ blocks of F St.

Riverside, Cal.—Three important pieces of road work are to be undertaken by the county and the Bd. of Spvs. will fix the tax rate at 40c. for good roads; Magnolia Ave. will be connected with Corona by a new road two miles long; Wineville and Ontario are to be connected by a new macadam highway and a macadam highway is to be constructed from Box Springs to Alessandro.

Bids will be called for soon for the improvement of three of the main streets. Two kinds of paving will be specified, oiled macadam and asphalt.

San Diego, Cal.—The paving of National Ave. with asphalt from 31st St. to the eastern city limits is contemplated.

The San Diego Subdivision Co. will expend about \$30,000 in the construction of curbing, sidewalks, etc., in a large tract recently acquired adjoining Olivewood Terrace.

Boulder, Cal.—H. E. Philips, City Eng., is preparing plans and specifications for grading, curbing, sidewalks and paving a 40-ft. roadway with Tarvia "X" on 15th St. for a distance of 1,000 ft. in accordance with the petition of the property owners.

Atlanta, Ga.—At a recent special meeting of the Public Works Comm. of the Co. Bd. of Cmsrs. it was agreed to place bitulithic pavement from Buckhead out Peachtree road to the county line.

Chicago, Ill.—Bids will be received for constructing cement sidewalks in many streets. Address Edward J. Glackin, Sec'y.

Warren, Ill.—The City Council is planning to pave Main St. with brick. Address City Clerk.

Okaloosa, Ia.—The Council is preparing to improve several streets by paving. Address City Clerk.

Kansas City, Kan.—A resolution has been adopted by the Bd. of Cmsrs. of the city of Kansas declaring it necessary that Mill St. be paved with six inch concrete to a width of 30 ft. between Vermont and Colorado Aves.

Coboes, N. Y.—Acting Mayor Kline has approved an ordinance for paving Congress St., the Garner St. extension and Bemis alley.

Newark, N. J.—An ordinance has been passed providing for the grading of the extension of Cummings St. from the southerly line of property now or formerly belonging to Ophelia Clements, northerly to Madison Ave.

An ordinance has been passed providing for the opening of 21st St. from 19th Ave. northerly to 18th Ave.

An ordinance has been passed providing for the grading of Berkshire Ave. between Prospect and Union Aves.

New York, N. Y.—Sealed bids will be received by the President of the Borough of The Bronx at his office in the Municipal Bldg. until 10:30 a. m., Oct. 8, 1912, for repairing sheet asphalt pavement in the Borough of the Bronx and setting curb where necessary, together with all work incidental thereto. For repairing asphalt block pavement in the Borough of The Bronx and setting curb where necessary, together with all work incidental thereto. For paving with asphalt blocks on a concrete foundation the roadway of Teller Ave. from E. 164th St. to E. 167th St., setting and resetting curb where necessary, together with all work incidental thereto (permanent pavement). For repaving with sheet asphalt on the existing concrete foundation the easterly portion of the roadway of White Plains Road, from Gun Hill Road to E. 227th St., and setting curb where necessary, together with all work incidental thereto.

Sealed bids or estimates will be received by the President of the Boro. of Brooklyn at his office, Room 2, Boro Hall, Brooklyn, until 11 a. m., Oct. 9, for regulating, grading, curbing and laying sidewalks on Amboy St., from Sutter Ave. to Blake Ave. For regulating, grading, curbing and laying sidewalks on Barrett St., from Dumont Ave. to Livonia Ave. For regulating, grading, curbing and laying sidewalks on Beverley Road, from Nostrand Ave. to Rogers Ave. For regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of Cornelia St., from Irving Ave. to Queens County line, where not already paved. For regulating, grading, curbing and laying sidewalks on Crown St., from Nostrand Ave. to New York Ave. For regulating, grading and curbing Ditmas Ave., from Ocean Parkway to E. 9th St., and laying sidewalks from Ocean Parkway to E. 7th St. For regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of Ditmas Ave., from Ocean Parkway to Coney Island Ave. For regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of E. 2nd St., from Beverley Road to Cortelyou Road. For regulating, grading, curbing and laying sidewalks on E. 7th St., from Church Ave. to Beverley Road. For regulating and paving with permanent asphalt pavement on a 6-in. concrete foundation the roadway of E. 14th St., from Ave. H to Ave. I. For regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of E. 32d St., from Farragut Road northerly to the line of the waterworks. For regulating and paving with permanent asphalt pavement on a 6-in. concrete foundation the unpaved portion of the intersection of Lefferts Ave. and Nostrand Ave. For reg-

ulating, grading, curbing and laying sidewalks on Lenox Road, from E. 34th St. to New York Ave. For regulating and paving with a preliminary pavement of second-hand granite blocks on a sand foundation the roadway of Metropolitan Ave., from Grand St. to the borough line. For regulating, grading, curbing and laying sidewalks on Montauk Ave., from Liberty Ave. to Pitkin Ave., For regulating, grading, curbing and laying sidewalks on Ave. N., from E. 15th St. to Coney Island Ave. For regulating and paving with permanent grade No. 1 granite pavement on a 6-in. concrete foundation the roadway of Norman Ave., from a line about 100 ft. west of Morgan Ave. to Bridgewater St. For regulating, grading, curbing and laying sidewalks on the widened portions of Roebling St., from Division Ave. to Broadway, and of Taylor St., from Lee Ave. to Bedford Ave., and on the triangular public place at the intersection of Division Ave. and Lee Ave. For regulating, grading, curbing and laying sidewalks on Rutland Road, from Nostrand Ave. to Kingston Ave. For regulating, grading, curbing and laying sidewalks on Winthrop St., from Albany Ave. to Remsen Ave. For regulating, grading, curbing and laying sidewalks on W. 19th St., from Neptune Ave. to Surf Ave., excluding the right of way of the New York and Coney Island Railway Company. For regulating, grading, curbing and laying sidewalks on W. 20th St., from Neptune Ave. to Surf Ave., excepting the portion occupied by the tracks of the New York and Coney Island Railroad Company. For regulating, grading, curbing and laying sidewalks on 16th Ave., from 68th St. to 70th St. For regulating, grading, curbing and laying sidewalks on 25th Ave., from Stillwell Ave. to Halfway Ave. For regulating, grading, curbing and laying sidewalks on 35th St., from Church Ave. to West St. For regulating, grading, curbing and laying sidewalks on 36th St., from 12th Ave. to West St., and on New Utrecht Road, from Church Ave. and 36th St. to 14th Ave. For regulating, grading, curbing and laying sidewalks on 51st St., from New Utrecht Ave. to 13th Ave. For regulating, grading, curbing and laying sidewalks on 56th St., from 15th Ave. to 16th Ave. For regulating and paving, with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of 56th St., from 12th Ave. to 13th Ave. For regulating, grading, curbing and laying sidewalks on 59th St., from 21st Ave. to Bay Parkway. For regulating, grading, curbing and laying sidewalks on 66th St., from 11th Ave. to 13th Ave. For regulating, grading, curbing and laying sidewalks on 68th St., from 13th Ave. to 14th Ave. For regulating, grading to a width of 24 ft. on each side of the centre line, curbing and laying sidewalks on 74th St., from 13th Ave. to 14th Ave. For regulating, grading, curbing and laying sidewalks on 75th St., from a point 200 ft. east of Fort Hamilton Ave. to 10th Ave., and from 15th Ave. to Bay Parkway (22d Ave.) For regulating, grading, curbing and laying sidewalks on 75th St., from 11th Ave. to 12th Ave. For regulating, grading, curbing and laying sidewalks on 77th St., from 11th Ave. to 12th Ave. For regulating, grading, curbing and laying sidewalks on 78th St., from 4th Ave. to 5th Ave. For regulating, grading, curbing and laying sidewalks on 83d St., from 22d Ave. to 24th Ave. For regulating, grading, curbing and laying sidewalks on 84th St., from 13th Ave. to 14th Ave. For constructing cement sidewalks on the north side of 57th St., between 2d Ave. and 3d Ave., and on various other streets.

Akron, O.—The following ordinances have been passed by the City Council: Determining to proceed with the improvement of Vine St., from Spicer St. to Fountain St., Nash St., from Spicer St. to Fountain St., and Fountain St., from Carroll St. to the right of way of the Akron and Barberton Belt Railroad Co. by grading, curbing, paving and constructing sidewalk 5 ft. in width. Determining to proceed with the improving of South Johns Ave., from East Market St. to Martha Ave., by grading, curbing, paving and constructing 5-ft. sidewalk of both sides thereof.

Issuing bonds to pay the corporation's part of the cost and expense of improving certain streets by grading and paving.

Determining to proceed with the improvement of Dixon Pl. from Carroll St. to the end thereof by curbing, grading, paving and constructing sidewalks.

Determining to proceed with the im-

provement of Clark St. from Bruner St. to Matthews St. by grading, curbing and paving with brick.

Determining to proceed with the improvement of Beaver St. from Carroll St. to Exchange St. by grading, curbing, paving and constructing sidewalks. W. L. Carlton is Pres. of the Council.

Canton, O.—A resolution has been adopted by the City Council declaring it necessary to improve McKinley Ave. from Cedar St. to the south end by grading to the established grade, setting curbing, laying flagstone sidewalks, paving the roadway with vitrified paving blocks and providing the necessary drainage.

Cincinnati, O.—Estimates for the improvement of Deerfield Road in Columbia Twp. at a cost of \$9,686.80 and for the roadway of Montgomery Pike in Silverton at a cost of \$3,136 have been approved by the Commissioners of Hamilton Co.

An ordinance has been passed authorizing the appropriation of property to public use for the opening, widening and extending of Fairview Ave., from Herman St. south to McMillan St.

Cleveland, O.—The following ordinances have been passed by the City Council: To levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Forestdale Ave., S. W. from W. 18th St. to W. 25th St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Empire Ave. N. E., from E. 93d St. to E. 102d St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Cannon Ave. S. E. from E. 86th St. to E. 93d St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Crofoot Ave. S. E. from E. 81st St. to E. 82d St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 103d St., from Madison Ave. N. W. to Lorain Ave.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 106th St., from Lorain Ave. to Theodore Ave. N. W.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Armitage Ave. S. E. from E. 93d St. to E. 92d St. and E. 92d St., from Cannon Ave. S. E. to Armitage Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Collier Ave. S. from E. 66th St. to E. 67th St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Wamelink Ave. S. E. from Woodhill Rd. S. E. to Steinway Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 52d St., from Kirkham Ave. S. E. to Fleet Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 67th St., from St. Clair Ave. to Lake Shore & Michigan Southern R. R.; to levy and assess a special tax to pay the cost and expense of grading, draining,

setting curbs, paving and improving W. 29th Pl., from Circle Court N. W. to 122 ft. north of Carroll Ave. N. W.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving St. Clair Ave. N. E. from Penobscot Ave. N. E. to Cleveland Short Line R. R.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Carnegie Ave. S. E. from E. 55th St. to E. 89th St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Trowbridge Ave. S. W. from Fulton Rd. S. W. to W. 44th St.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving West 22d Pl. from Denison Ave. S. W. to 448 ft. northerly; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 108th St., from North line Crown Ave. S. W. to 540 ft. south of Abbey Ave. S. W.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 108th St., from Cedar Ave. S. E. to Arthur Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 41st St., from Denison Ave. S. W. to 521 ft. southerly; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 113th St., from Harvard Ave. S. E. to Miles Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 79th Pl., from Lake Ave. N. W. to 273 ft. northerly; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving DuPont Ave. N. E. from E. 105th St. to 830 ft. easterly; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 55th St., from Fleet Ave. S. E. to 211 ft. E. of Mound Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 66th St., from Clement Ave. S. E. to Harvard Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 106th St., from Lorain Ave. to Madison Ave. N. W.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving W. 89th St., from Madison Ave. N. W. to Sauer Ave. N. W.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Broadway S. E. from S. L. Miles Ave. S. E. to 450 ft. southerly; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 59th St., from Bower Ave. S. E. to Francis Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 89th St., from Buckeye Rd. S. E. to Evarts Rd. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving E. 67th St., from Fleet Ave. to Baxter Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and improving Random Rd. S. E. from Cornell Rd. S. E. to Paul Ave. S. E.; to levy and assess a special tax to pay the cost and expense of grading, draining, setting curbs, paving and im-

proving Irma Ave. S. E. from E. 71st St. to E. 74th St.

Sealed proposals will be received at the office of the Bd. of Cmrs. of Cuyahoga Co. until 11 a. m., Oct. 9, 1912, for the improvement of Warren Rd., from Detroit Rd. to Fisher Rd. in Rockport Twp., in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Co. Surv.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Commissioner at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with sulphite treated macadam the Springfield Rd. in Mad River Twp., Montgomery Co. Length, 13,484 ft.; width, 16 ft.; estimated cost of construction, \$15,399.10.

Alternative bids will also be considered for grading and paving the above road with a bituminous bonded macadam. Estimated cost of construction, \$16,842.82. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Oct. 11, 1912, for grading and paving with bituminous surface treated macadam the State Rd., Erie Co. Length, 5,300 ft.; width, 10 ft.; estimated cost of construction, \$5,835.10.

Alternative bids will also be considered for grading and paving the above road with a bituminous surface treated concrete pavement. Estimated cost of construction, \$6,967.90. Plans and specifications are on file in the office of the Co. Cmrs. and the State Highway Dept.

Allentown, Pa.—The City Council has passed an ordinance authorizing the borrowing of \$55,000, most of which will be used for street paving.

Harrisburg, Pa.—Sealed proposals will be received at the office of the State Highway Dept. in the Capitol Building, Harrisburg, Pa., until 10 a. m., Oct. 15, 1912, for the reconstruction of 3,900 ft. of asphaltic bituminous macadam road, penetration method, 16 ft. wide, from the Galeton borough line to a point near the property of M. H. Stebbins.

Sealed proposals will be received at the office of the State Highway Dept., until 10 a. m., Oct. 15, 1912, when bids will be publicly opened and scheduled for the reconstruction of 5841 lin. ft. of brick block paving, 16 ft. wide, from the southwest line of Avoca Borough, station 484+10 via Main St. to the Duryea Borough line.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, when alternate bids will be publicly opened and scheduled for the reconstruction of 24,435 lin. ft. of asphaltic concrete road, on a concrete foundation; and brick block paving, on a concrete foundation, 16 ft. wide, from the Avoca-Duryea borough line in Luzerne Co. to the City line of Scranton, in Lackawanna Co.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, for the reconstruction of 14,317 lin. ft. of concrete roadway with bituminous top, 16 ft. wide, from Bethayres, station 1005+86, to the city line of Philadelphia, station 1149+03.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, for the reconstruction of 11,000 lin. ft. of asphaltic-macadam road, 16 ft. wide, from the borough line of Mechanicsburg, on South Market St. toward Bowmansdale, to the Gettysburg Road.

Sealed proposals will be received at the office of the State Highway Dept. until

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10 a. m., Oct. 15, 1912, when alternate bids will be publicly opened and scheduled for the reconstruction of 45,167 lin. ft. of asphaltic-concrete road on a concrete foundation, and asphaltic-bituminous macadam road, penetration method, on a telford foundation, 16 ft. wide, from the east borough line of Ridgeway, station 70-28, to the west borough line of St. Mary's Station, 521-96.

Sealed proposals will be received at the office of the State Highway Dept., until 10 a. m., Oct. 15, 1912, for the reconstruction of 20,053 lin. ft. of asphaltic-bituminous macadam road, penetration method, 14 ft. wide, from the east line of Oakland Borough to the New York State line.

Sealed proposals will be received at the office of the State Highway Dept. in the Capitol Building, Harrisburg, Pa., until 10 a. m., Oct. 15, 1912, for the reconstruction of 4,371 lin. ft. of brick block paving, 16 ft. wide, from the west line of Pauxsuttawney borough, on Indiana St. to the intersection of Indiana and Gilpin Sts.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, for the reconstruction of 9,837 lin. ft. of asphaltic-bituminous macadam road, penetration method, 16 ft. wide, from a point near the property of Roy Putnam, station 79+00, to Lander station 177+37.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, for the reconstruction of 6,283 lin. ft. of brick block and asphaltic-bituminous macadam road, penetration method, 16 ft. wide, from School St. station 25+20, near the property of Jas. Calhoun, to the Pike township line, station 88+03.

Sealed proposals will be received at the office of the State Highway Dept. until 10 a. m., Oct. 15, 1912, when bids will be publicly opened and scheduled for the reconstruction of 3,119 lin. ft. of brick block paving, 16 ft. wide, situated as follows: From the Co. line on bridge, at Curtin St. to Decatur Twp. line at Lingle St.

Providence, R. I.—Sealed proposals for the construction of a section of State highway in the town of North Providence about 5,280 ft. in length; section in the town of Lincoln about 3,000 ft. in length; a section in the town of Narragansett about 6,500 ft. in length, will be received by the State Board of Public Roads at the office, State House, Providence, R. I., until noon, Oct. 9, 1912. Plans, specifications and drawings may be examined at the office of the State Board of Public Roads, in the State House, Providence, R. I.

Bids Received and Contracts Awarded.

Los Angeles, Cal.—P. A. and C. H. Howard were awarded the contract by the Co. Bd. of Spvs. for the improvement of two miles of Huntington Drive (being a portion of the county good roads system) at 50c. per cu. yd. for 2,800 cu. yds. of excavation, 9c. per lin. ft. for 12,645 lin. ft. of shaping road bed, 48.9c. per sq. yd. for 29,000 sq. yds. of concrete bituminous paving, 99c. per cu. yd. for 28.3 cu. yds. of Class A concrete, 4c. per lb. for 1,004 lbs. of reinforcing steel, 75c. per lin. ft. for 110 lin. ft. of 12-in. reinforced pipe. Total, \$17,051.41.

The Barber Asphalt Paving Co. was awarded the contract for improving Stephenson Ave. from Chicago St. to the Eastern city limits, at 17c. per sq. ft. for asphalt paving, 37½c. per lin. ft. for cement curb, 26c. per sq. ft. for vitrified block gutter, \$1.995 for culverts; aggregate amount, \$68,045.39.

The Barber Asphalt Paving Co. was awarded the contract for improving First St. from Evergreen Ave. to the eastern city limits at 17.2c. per sq. ft. for asphalt paving, 35c. per lin. ft. for cement curb, 26c. per sq. ft. for vitrified block gutter, 41.1c. per sq. ft. for granite block gutters, 11c. per sq. ft. for cement sidewalks, \$1.883 for storm drain, \$428 for same; total, \$28,204.18.

Centralia, Ill.—Hoeffken Bros. of Belleville have been awarded the paving contract in Centralia at \$49,989.

Monmouth, Ill.—The Bd. of Local Imps. has awarded the contract for the construction of all new paving in the South D St. district to the Burlington Constr. Co. at about \$15,400.

Indianapolis, Ind.—The lowest bid for resurfacing with asphalt Georgia St., between Capital and Kentucky Aves, was \$3.64 per lin. ft., submitted by the Union Asphalt Constructing Co.

Michigan City, Ind.—The following bids have been received for the paving of portions of W. 7th, 8th and 9th Sts.: J. C. Devine Co., Alliance, O., \$1.52 and \$1.58 a sq. yd., according to kind of brick used

on a sand foundation, and \$1.90 to \$1.99 on a concrete foundation. Curb and gutter 38 cts. a foot extra. Peter Michaely, \$1.45 for brick on sand foundation and \$1.99 on concrete. Curb and gutter 42 cts. a foot extra. Western Constr. Co., Lafayette, \$1.88 per sq. yd. for asphalt, asphalt macadam, \$1.66, curb and gutter, 40 cts.

Camden, N. J.—The street committee of the Camden City Council has awarded a contract for the paving of Haddon Ave. between the tracks of the Public Service Corporation from Line St. to City Line with Belgian blocks on a concrete foundation to Aaron Ward at \$2.81 per cu. yd. Total amounts to nearly \$50,000. Other bids were W. Penn Corson, \$3 per sq. yd.; John McFeeley, \$3.02 per sq. yd.; J. W. Carey, \$3.33 per sq. yd.; B. F. Sweeten & Son, \$3.15 per sq. yd.

Rochester, N. Y.—The Bd. of Contract and Supply awarded contracts for public improvements as follows: Medina stone pavement and sewer in Cataract St., to Nicolo Desiderio for \$3,444.20; new walks in Madison St., to H. Schoenfeld for \$132.50; sewer and macadam pavement in Colby St., to F. V. Brothsch & Hempel for \$2,755.50.

Columbus, O.—The contract for grading and paving with gravel macadam the Dayton-Springfield Road in Bath Twp., Green Co., length, 10,663 ft., width, 14 ft., has been awarded to Korah E. Kunkle of Dayton at \$6,446.

The contract for grading and paving with a waterbound macadam the Warren-Meadville Road in Johnston Twp., Trumbull Co., length, 18,500 ft., width, 10 ft., has been awarded to Seiple & Wolf of Dayton at \$21,990.43.

Cincinnati, O.—The County Commissioners of Hamilton Co. have awarded the contract for the improvement of Clough Creek Pike between Batavia Pike and Bogart Road to Van Camp Bros. at their bid of \$10,746.

Lorain, O.—Bids have been received for the paving of E. 29th St., from Pearl Ave. to Fulton Road and Fulton Road, from E. 28th St. to E. 29th St., as follows: Sheet asphalt, J. M. Dole, Trinidad and California, \$31,762; Ohio Engineering Co., Obispo, 1½-inch, \$35,274; Ohio Engineering Co., Obispo, 2-inch, \$36,964; W. S. Pace, California, \$35,734.50. Stone filled sheet asphalt, Ohio Engineering Co., Obispo, 2-inch, \$31,894; W. S. Pace, California, \$32,368.50. Vitrified brick, W. S. Pace, any brick, \$33,068.50; Ohio Engineering Co., Metropolitan or Deckman-Duty, \$34,494. Asphalt block, Asphalt Block Paving Co., 2-inch block, \$37,933; Asphalt Block Paving Co., 2½-inch, \$39,623.

Bids have been received for paving W. 27th St., from Broadway to Lexington Ave., as follows: Stone filled sheet asphalt, Ohio Engineering Co., Obispo, \$8,188.85; W. S. Pace, California, \$8,696.30; vitrified brick, W. S. Pace, any brick, \$8,936.30; Ohio Engineering Co., Metropolitan or Deckman-Duty, \$8,730.85; sheet asphalt, Ohio Engineering Co., Obispo, 1½-inch, \$8,912.85; Ohio Engineering Co., Obispo, 2-inch, \$9,274.85; W. S. Pace, California, \$9,203.10; asphalt block, Asphalt Block Paving Co., 2-inch block, \$9,496.75; Asphalt Block Paving Co., 2½-inch block, \$9,858.75.

BRIDGES.

Bids Received and Prospective Work.

Eufaula, Ala.—At a recent special meeting of the Bd. of Revenue it was decided to improve two bridges. The Tony bridge north of the city, and the Barbour bridge south of the city at a cost of \$8,000. Address Mayor.

Santa Barbara, Cal.—Bids will be received Oct. 7 for labor and material necessary for building a bridge across the San Pablo Creek on Hollister Ave. At the same time bids will be received for building a bridge across the Carneros Creek on Hollister Ave. Address C. A. Hunt, Co. Clerk.

Angola, Ind.—Bids will be received Oct. 7 for the furnishing of all labor and material for the construction of one concrete arch bridge in Steuben Twp. Address James A. Shaughness.

Goshen, Ind.—Appropriations aggregating \$4,000 for making repairs to Elkhart Co. bridges damaged by floods resulting from a recent storm, were allowed by the county council in session. Address Co. Surv.

Salem, Ind.—Bids will be received Oct. 7 for the construction of a 30 by 12-ft. beam bridge on the county line. Also bids for stone abutments for said bridge. Address Frank S. Munkelt.

Muscatine, Ia.—The council and the In-

terurban Co. will build a modern bridge. Address City Engr.

Detroit, Mich.—The Cadillac Motor Car Co. has sent a petition to the Common Council asking permission to build three bridges over Cass Ave., between Amsterdam and Baltimore Sts. Address City Engr.

Albany, N. Y.—Sealed proposals will be received by the State Supt. of Highways at its office, No. 55 Lancaster St., Albany, at 1 p. m., Oct. 14, 1912, for the building of the following: South Bay Bridge, west of Whitehall, in Washington Co. Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y.

Cincinnati, O.—The Co. Commrs. of Hamilton Co. have approved plans and specifications for a new bridge over Mill Creek on the Clark Road. Estimated cost, \$10,279.

Cleveland, O.—Bids will be received Oct. 23 for the construction of a steel bridge on River Road, over Chippewa Creek, in accordance with the form of contract and specifications to be furnished by Frank H. Lander, Co. Surv. Address John F. Goldenbogen, Clerk.

Lebanon, O.—Bids will be received Oct. 7 for the construction of a low truss steel bridge with creosoted plank and block floor, and two concrete sidewalks over Turtle Creek. Address T. C. Patterson, Co. Aud.

Fort Worth, Tex.—Bids will be received Oct. 23 for the construction of two reinforced concrete viaducts according to plans and specifications prepared by Brenneka and Ray, consulting engineers. One viaduct known as the Main St. viaduct has a total length of 1,752 ft. 3 ins., consisting of 476 ft. 6 ins. retaining wall construction, seven 50-ft. girder spans, three 62-ft. 8-in. girder spans, one 150-ft. arch span, two 175-ft. arch spans, and one 22-ft. arch span. Address J. A. Mulholland, Co. Aud.

Bids Received and Contracts Awarded.

Jasper, Ala.—The contract for the erection of a bridge over Mulberry Creek, Walker Co., was let by the Merrill Coal Co. to Virginia Bridge Co. at \$20,000.

Cincinnati, O.—The contract for the construction of a concrete bridge on the Cincinnati and Dayton Pike in the village of Sharonville has been awarded by the county commissioners of Hamilton County to A. H. Doebel at \$2,361.

The contract for the construction of a new bridge on the Seven Mile Road was awarded to H. F. Nagel at \$480.

Irwin, Pa.—The contract for construction of the steel truss bridge over Mrush Creek, at Trafford Borough was awarded to R. C. Bogler, of Greengburg, at \$3,064.20.

York, Pa.—The Co. Cmrs. of York Co. have awarded the contract for the construction of a stone arch bridge across a branch of Muddy Creek, on the public road leading from cross road to new park, to Francis Keesey, at \$773.

Austin, Tex.—The contract for roadways and alterations to the bridge over Walnut Creek, on the Webberville Road, in Travis Co., has been awarded to C. O. Horton, at \$1,375.

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BONDS.

Milton, Fla.—An election will be held Oct. 15, to decide the question of issuing bonds for the construction of county bridges. Address Peter Tomasello, Chmn. of Bd. of Co. Cmrs.

Bellevue, Ky.—An election will be held in November to decide the question of issuing \$60,000 in bonds for constructing streets and alleys. Address City Clerk.

Saginaw, Mich.—A special election will soon be called to submit a \$35,000 road bond issue to voters.

Jackson, Miss.—Sealed bids will be received by the Bd. of Spvrs. of Noxubee Co., at its October meeting, for \$75,000 in bonds, the proceeds to be used in the construction of roads in the Fifth District.

Vicksburg, Miss.—Bids will be received Oct. 7 for the purchase of \$50,000 5% road and bridge bonds. Address J. D. Laughlin, Clerk.

Bids will be received Oct. 7 for the purchase of \$6,600 5% Warren Co. bridge and road bonds. Address J. D. Laughlin, Clerk.

Kansas City, Mo.—It is stated that Mayor Jost recommends an issue of \$700,000 in bonds for building bridges and viaduct.

Lebanon, O.—Bids will be received Oct. 10 for the purchase of \$22,000 4% bridge bonds. Address T. C. Patterson County Aud.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

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NEW YORK, OCTOBER 12, 1912

Number
15

The Atlantic City Road Congress

The first road congress held jointly by the American Association for Highway Improvement, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers was held on Young's Million Dollar Pier at Atlantic City, N. J., during the six days from September 30 to October 5. The sessions of the congress were held in the Hippodrome and in the Greek Temple on the pier and the exhibition of road machinery and materials in the main hall at the shore end of the pier. Official figures as to the total number registered have not as yet been given out, and the variation in attendance at the different sessions made it difficult to make a reasonably accurate estimate of the average attendance. Except at the session at which Governor Woodrow Wilson of New Jersey addressed the congress, the maximum number present was about 250. The general public was allowed admittance to the meeting which Governor Wilson addressed and during his speech there were probably 1,200 present.

The first session was called to order at 10:50 a. m., Monday, Sept. 30, by Logan Waller Page, Director of the U. S. Office of Public Roads and President of the American Road Congress. After an invocation by Rev. Newton W. Cadwell, of Atlantic City, President Page made a brief introductory address and then introduced President Robert P. Hooper of the American Automobile Association, the organization under the auspices of which the proceedings of the first two days of the congress were held. After a few introductory remarks, President Hooper introduced Professor Chas. Thaddeus Terry, Chairman of the A. A. A. Legislative Board, who spoke on "The Making of Automobile Law." Mr. Terry was followed by N. P. Hull of the National Grange Legislative Committee, whose address was entitled "The Farmer and His Road Using." The last speech of the morning was an address of welcome to Atlantic City by Commissioner William Riddle, who had been detained and had been unable to be present to welcome the delegates earlier in the session.

The afternoon session was called to order at 2:45 by President Hooper, who introduced Governor Woodrow Wilson of New Jersey, the first speaker of the afternoon. Governor Wilson, besides welcoming the congress to the state of New Jersey, spoke at considerable length upon road improvement, with especial reference to participation by the federal government. Other speakers at the afternoon session were Powell Evans, President of the Automobile Club of Philadelphia, Pa., on "A National System in Marking the Roads"; H. L. Vail, a member of the Board of County Commissioners of Cuyahoga County, Ohio, on "Organized Effort versus Individual Effort"; State Senator Walter E. Edge of New Jersey, on "Why New Jersey Opened Her Gates," and Jos. H. Weeks, Chairman of the Good Roads Committee of the Pennsylvania Motor Federation, on "How to Work for State Aid."

The third session of the congress was called to order at 10:30 a. m., Tuesday, by Geo. C. Diehl, Chairman of the Good Roads Board of the A. A. A., who presided in the

absence of President Hooper, who had been called out of town. The first speaker of the morning was J. C. Scates, Secretary of the Maine Automobile Association, whose subject was "The Maine Plan"; Judge J. M. Lowe, President of the National Old Trails Road Association, who, with Mrs. Donald McLean, was to have spoken on the subject "National Old Trails," was unable to be present, but sent a paper which was read by Jesse Taylor, Secretary of the Ohio Good Roads Federation. Mrs. Donald McLean, Honorary President General of the Daughters of the American Revolution, followed, speaking on the same subject. In the absence of Judge H. C. Gilbert, of Jackson County, Mo., who was to have spoken on "The Logic of Federal Aid," and Congressman D. W. Shackelford, of Missouri, who was to have spoken on "One Plan of Federal Aid," Chairman Diehl called upon State Highway Commissioner James H. MacDonald of Connecticut, who spoke briefly, and was followed by A. G. Batchelder, Chairman of the Executive Committee of the A. A. A., who also made a brief address. After Mr. Batchelder's address, Morris R. Sherrerd, City Engineer of Newark, N. J., presented a resolution recommending that the president of the congress appoint a committee of five to suggest legislation for the regulation of the use of roads by automobile trucks and other forms of traction engines. Mr. Sherrerd was followed by Frederick F. Smith, President of the New Jersey Automobile and Good Roads Association, who spoke briefly on the subject of road marking, supplementing the remarks made by Mr. Evans on the previous day. After this there was a short discussion participated in by W. P. Blair and others, after which the congress adjourned until the afternoon.

The fourth session was opened at 2:30 p. m., Tuesday, by Chairman Diehl, who introduced G. Grosvenor Dawe, Chief of the Editorial Division of the Chamber of Commerce of the United States, who spoke on the topic "Business Organizations as Good Roads Accelerators." Mr. Dawe was followed by five speakers on the general topic "How to Encourage the 'See America First' Idea." The speakers were Preston Belvin, President of the Virginia State Automobile Association; Dr. Joseph Hyde Pratt, State Geologist of North Carolina and President of the Southern Appalachian Good Roads Association; D. M. Potter of Arizona, Vice President of the Ocean-to-Ocean Highway Association; Capt. H. Z. Osborne, Secretary of the Los Angeles (Cal.) Chamber of Commerce, and Frank D. Lyon, Secretary of the New York State Automobile Association.

The sessions of the congress under the direction of the American Association for Highway Improvement began on Wednesday forenoon. The first of these sessions was called to order by Logan Waller Page, President of the American Association for Highway Improvement, who announced that President Taft, whom the association had hoped to have present, had been forbidden by his physician to speak, and that Secretary James Wilson of the Department of Agriculture, who was to have taken the place of the President, should he be unable to attend, had

been prevented from coming to Atlantic City. President Page then introduced M. de Pulligny, Engineer in Chief of Bridges and Highways of France, the first speaker of the session. M. de Pulligny, who at present is stationed in this country with an office in New York for the purpose of studying American methods of road construction and maintenance, presented a paper entitled "The Road Systems of France." M. de Pulligny was followed by J. E. Caron, Minister of Agriculture and Roads of the Province of Quebec, Canada, who described road work in his province. He was followed by W. A. McLean, Provincial Engineer of Highways of Ontario, Canada, who spoke on the topic "Road Improvement in Canada;" W. W. Finley, President of the Southern Railway Co., who addressed the congress on "Good Roads and Cost of Living;" Henry W. Anderson, of Richmond, Va., who spoke on "Needed Reforms in Road Legislation," and L. V. Boughner, Chairman of the Highway Improvement Committee of the Civic and Commerce Association of Minneapolis, Minn., who described the publicity methods employed by that association in a road improvement campaign in Hennepin County.

At this session, President Page announced the appointment of the committee on resolutions as follows: F. G. Norris, Arizona; W. S. Keller, Alabama; A. G. Spalding, California; J. H. MacDonald, Connecticut; Prevost Hubbard, District of Columbia; L. D. Smoot, Florida; David Beecroft, Illinois; C. A. Kenyon, Indiana; L. H. Nelson, Maine; H. G. Shirley, Maryland; A. W. Dean, Massachusetts; G. W. Cooley, Minnesota; H. C. Gilbert, Missouri; F. E. Dunbar, Michigan; F. F. Smith, New Jersey; C. G. Reel, N. Y.; J. H. Pratt, North Carolina; W. P. Cantwell, South Carolina; George McBride, Nebraska; S. D. Foster, Pennsylvania; G. E. Gordon, Philippine Islands; Gervais Lombard, Louisiana; M. B. Beers, Utah; J. B. Wilbur, Vermont; Preston Belvin, Virginia; J. A. Sheppard, West Virginia, and F. G. Simmons, Wisconsin.

The Legislative Section was called to order on Wednesday afternoon by President Page, who introduced Col. Wm. D. S. hier, Chairman of the Massachusetts Highway Commission, as chairman. After a brief introductory address, Col. Sohler introduced State Highway Commissioner James H. MacDonald of Connecticut, who spoke on "The Evolution of State Highway Departments." Commissioner MacDonald was followed by Clarence A. Kenyon of Indianapolis, Ind., and Charles Dew of Birmingham, Ala., both of whom spoke on the subject of highway legislation.

The session on Thursday morning, which was divided into a Finance Section and an Administrative Section, was called to order at 10:20 a. m. by President Page, who introduced Lee McClung, Treasurer of the United States, as chairman of the Finance Section. After presenting a paper on "Bond Issues for Road Improvement," Mr. McClung introduced Henry G. Shirley, Chief Engineer of the Maryland State Roads Commission, who presented a paper on "Road Accounting." The last speaker of the Finance Section was Jacob S. Coxey, who spoke of the early efforts at securing highway improvement in Ohio and explained his present plan for a bond issue of \$100,000,000.

After Mr. Coxey's address, Mr. McClung introduced Col. E. M. Bigelow, State Highway Commissioner of Pennsylvania, as chairman of the Administrative Section. After making a brief address on the Pennsylvania system, Col. Bigelow introduced S. Percy Hooker, State Superintendent of Highways of New Hampshire, who spoke on the topic "Administrative Systems of Road Maintenance." Following Mr. Hooker's address, there was a general discussion participated in by Messrs. Bigelow, Hooker, Diehl and others.

The afternoon session on Thursday, like the morning session, was divided into two sections, the first on economics and the second on highway engineering education.

The meeting was called to order by President Page, who introduced Dr. Joseph Hyde Pratt, State Geologist of North Carolina, as chairman of the Economics Section. The first two addresses were on the topic "Convict Labor in Road Improvement" and were presented by Dr. Pratt and Professor E. Stagg Whitin, General Secretary of the National Committee on Prison Labor. These were followed by an address on "Good Roads, Rural Delivery and Parcels Post" by P. V. De Graw, Fourth Assistant Postmaster-General. This paper was scheduled for Wednesday forenoon, but on account of Mr. De Graw's inability to be present at that time was deferred until Thursday. Mr. De Graw was followed by Jesse Taylor, Secretary of the Ohio Good Roads Federation, who spoke on "The Benefits and Burdens of Road Improvement." The last address in the Economics Section was made by Howard D. Hadley, President of the Quebec-Miami International Highway Association, who spoke on the "Quebec-Miami International Highway."

At the close of Mr. Hadley's address, Dr. Pratt introduced Professor F. P. McKibben, of Lehigh University, who presided over the Highway Engineering Education Section, held under the auspices of the Society for the Promotion of Engineering Education. After a few introductory remarks, Professor McKibben introduced Arthur H. Blanchard, Professor of Highway Engineering, Columbia University, New York City, who read a paper entitled "Highway Engineering Education." Others who addressed the congress on the subject of engineering education, with especial reference to highway engineering, were S. A. Stephenson, Jr., Instructor in Mathematics and Graphics, Rutgers College, New Brunswick, N. J.; Professor E. B. McCormick, of the Kansas State Agricultural and Mechanical College, Manhattan, Kan., and Professor Hugh Miller of the Clarkson School of Technology, Potsdam, N. Y.

After the close of the discussion on the subject of highway engineering education, the committee on resolutions presented a report embodying a set of resolutions which was adopted as presented. These resolutions recommended the further extension of activity by the federal government in road building by the establishment of a federal department of roads; advised the establishment of schools for the training of road engineers; emphasized the necessity for proper maintenance of roads; recommended the appointment of a committee of three to confer with the American Bar Association in regard to the formulation of uniform highway laws; recommended the passage of state laws providing for convict labor on the roads; indorsed the efforts of the D. A. R. and the National Old Trails Road Association for the construction of a road following as closely as possible historic trails; commended the work of the United States Office of Public Roads; recommended a congressional appropriation for the construction of a Lincoln Memorial Highway between Washington and the Arlington National Cemetery, and voted the thanks of the congress to Atlantic City and the state of New Jersey for the hospitable entertainment accorded, to the exhibitors for their cooperation and to Governor Wilson for his address.

The last two days of the congress comprised the construction and maintenance section, the first session of which was opened on Friday forenoon with Col. E. A. Stevens, State Commissioner of Public Roads of New Jersey, in the chair. After a few introductory remarks, Col. Stevens introduced Col. Spencer Cosby, C. E., U. S. A., the official representative of the Corps of Engineers of the United States Army, who described the road construction work done by that body. The program from this point on comprised twenty-one questions, each to be presented by a speaker and discussed by the congress at large. Owing to the absence of a number of those having papers, the program as laid out was not followed closely, but it is un-

derstood that the papers scheduled will be included in the official proceedings of the congress when published by the association. The first speaker after Col. Cosby was Gervais Lombard, Acting State Highway Engineer of Louisiana, who presented a discussion on Question 1 (Surveys), a paper on which was to have been presented by Professor E. L. Griggs of the University of Georgia. Mr. Lombard was followed by Major J. W. Howard of New York City, who discussed briefly Question 4 of Subsection B (Foundation and Drainage), which was scheduled for presentation in a paper entitled "Fundamental Considerations" by Professor Thos. H. MacDonald, of the Iowa State College. The discussion was also participated in by W. P. Blair, Secretary of the National Paving Brick Manufacturers' Association, and James Owen, County Engineer of Essex County, N. J. Question 3, (Grades—Tractive Resistance of Various Surfaces—Relation to Traffic, etc.) was then discussed in a paper presented by E. B. McCormick, of the Kansas State Agricultural and Mechanical College, who was followed by W. S. Keller, State Highway Engineer of Alabama, who presented a paper on Question 5 (Earth, Sand-Clay and Simillar Materials) under Subsection C, (Road Surfaces). Mr. Keller was followed by C. Gordon Reel, State Superintendent of Highways of New York, who read a paper entitled "Trunk Line Highways." This paper was scheduled for Wednesday forenoon, but was deferred until Friday because of Mr. Reel's inability to be present at the former session. After some further discussion by various delegates, the meeting was adjourned until the afternoon.

The afternoon session was called to order by Col. Stevens at 2:20. All of the papers presented at this session were included under Subsection C, (Road Surfaces) and comprised Questions 6, 7, 8 and 9. The first paper was presented by Albert T. Goldbeck, Testing Engineer of the U. S. Office of Public Roads, who described the qualities, tests and selection of gravel and stone. The next paper, which took up the qualities and tests of bituminous materials, including tars, asphalts and oils, was presented by Dr. A. S. Cushman, Director of the Institute of Industrial Research, Washington, D. C. In the absence of Austin B. Fletcher, State Highway Engineer of California, who was scheduled to present Question 8, (Construction of Gravel and Water Bound Macadam Surfaces), this topic was presented by State Highway Commissioner James H. MacDonald of Connecticut, who described the methods followed in his state in the construction of roads of this character. Commissioner MacDonald was followed by M. de Pulligny, who, in a brief address, thanked the American Association for Highway Improvement for its action on the previous day in making him an honorary member of the association. The last paper of the afternoon was presented by Arthur H. Blanchard, Professor of Highway Engineering, Columbia University, New York City, who discussed Question 9 in a paper on "The Construction of Surfaces with Bituminous Materials."

On Friday evening a meeting was held at which Question 10 (Brick Roads) was presented in a paper by Theodore A. Randall, Secretary of the National Brick Manufacturers' Association, and Question 20 on "The Beautification of Roadsides" was presented by Glenn Brown, Secretary of the American Institute of Architects. Both papers were illustrated by lantern slides.

The last session of the congress was held on Saturday forenoon, the number who were scheduled to speak and who had not been able to attend making it possible to finish up the business of the congress in one session. The first paper at this session comprised the discussion of Question 11, (Concrete Roads), and was presented by A. N. Johnson, State Highway Engineer of Illinois. The paper was discussed at some length by Geo. W. Cooley, State

Engineer of Minnesota; R. A. Meeker, State Highway Engineer of New Jersey, and others. The next paper, "Experimental and Special Surfaces Applicable Under Special Conditions" (Question 12), was presented by Wm. H. Connell, Chief of the Bureau of Highways of Philadelphia, Pa. Following Mr. Connell, Question 13 (Earth, Sand-Clay and Gravel Roads), was discussed in a paper presented by Geo. W. Cooley, State Engineer of Minnesota. After Mr. Cooley's paper, Frederick F. Smith, President of the New Jersey Automobile and Good Roads Association, spoke briefly on the question of shell roads, and at the request of James Owen, County Engineer of Essex County, N. J., Mr. Cooley described the straw roads built in certain sections of Minnesota. Question 14 (Water Bound Macadam), was discussed in a paper presented by County Engineer Owen, and Question 18, (Street Paving), by Geo. W. Tillson, Consulting Engineer of the Borough of Brooklyn, New York City. The last paper of the congress, "The Relation of the Contractor to the Public Official," by C. A. Crane, Secretary of the General Contractors' Association, owing to the lateness of the hour, was read by title only, after which the congress adjourned sine die.

An exhibition of road machinery and materials was held in conjunction with the congress in a large hall near the entrance to the pier and comprised exhibits by many of the leading manufacturers of road machinery and materials. The exhibits included road rollers, concrete mixers, traction engines, dump wagons, sprinklers, oilers and other machinery; brick, concrete, wood blocks, asphalts, tars, oils and other materials of construction; engineers' instruments, and various displays of photographs, maps, plans, etc.

The firms who engaged booths and made exhibits in Machinery Hall were as follows: Acme Road Machinery Co., Frankfort, N. Y.; American Asphaltum & Rubber Co., Chicago, Ill.; American Tar Co., Malden, Mass.; American Rolling Mill Co., Middletown, O.; American Steel & Wire Co., Chicago, Ill.; Amies Road Co., Easton, Pa.; Association of American Portland Cement Manufacturers, Philadelphia, Pa.; Atlas Portland Cement Co., New York, N. Y.; Austin Western Co., Chicago, Ill.; Barber Asphalt Paving Co., Philadelphia, Pa.; Barrett Manufacturing Co., New York, N. Y.; Barron & Cole Co., New York, N. Y., selling agents for Baker Mfg. Co., Chicago, Ill.; Acme Equipment & Engineering Co., Cleveland, O.; Milburn Wagon Co., Toledo, O.; Walter Cressy, Gloucester, Mass., and Wheeling Mold & Foundry Co., Wheeling, W. Va.; Bausch & Lomb Optical Co., Rochester, N. Y.; "Better Roads," Jamestown, O.; Bucyrus Steam Shovel Company, South Milwaukee, Wis.; Chicago Pneumatic Tool Co., Chicago, Ill.; "Concrete Cement Age," Detroit, Mich.; Concrete Guard Rail Co., Rochester, N. Y.; Dolarway Paving Co., New York, N. Y.; Emerson-Brantingham Co., Waynesboro, Pa.; "Engineering & Contracting," Chicago, Ill.; "Engineering News," New York, N. Y.; "Engineering Record," New York, N. Y.; Equitable Surety Co., St. Louis, Mo.; A. B. Farquhar Co., York, Pa.; Frick Co., Waynesboro, Pa.; "Good Roads," New York, N. Y.; Good Roads Machinery Co., Kennett Square, Pa., selling agent for American Road Machine Co., Kennett Square, Pa.; Climax Road Machinery Co., Marathon, N. Y.; Indiana Good Roads Machinery Co., Fort Wayne, Ind., and Monarch Road Roller Co., Groton, N. Y.; Hastings Paving Co., New York, N. Y.; Hvass & Co., Charles, New York, N. Y.; Institute of Industrial Research, Washington, D. C.; Iroquois Iron Works, Buffalo, N. Y.; Kent Machinery Co., Kent, O.; Keystone National Powder Co., Emporia, Pa.; Koehring Machinery Co., Milwaukee, Wis.; "Municipal Journal & Engineer," New York, N. Y.; National Paving Brick Manufacturers' Association, Cleveland, O.; National Wood Safety Paving Co., Boston, Mass.; Robeson Process Co., Au Sable Forks, N. Y.; Standard Oil Co., New

York, N. Y.; Standard Scale & Supply Co., Pittsburgh, Pa.; Studebaker Corporation, South Bend, Ind.; Sullivan Machinery Co., Chicago, Ill.; Spray Nozzle Co., Boston, Mass.; Tarrant Mfg. Co., Saratoga Springs, N. Y.; Texas Co., New York, N. Y.; United States Asphalt Refining Co., New York, N. Y.; United Gas Improvement Co., Philadelphia, Pa.; Universal Portland Cement Co., Chicago, Ill.; United States Wood Preserving Co., New York, N. Y.; Warren Bros. Co., Boston, Mass.; Watson Wagon Co., Canastota, N. Y.; Western Wheel Scraper Co., Aurora, Ill.; Wheeling Mold & Foundry Co., Wheeling, W. Va. A combination exhibit of cast iron pipe for culvert purposes by the American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow, Chicago, Ill.; Glamorgan Pipe & Foundry Co., Lynchburg, Va.; Lynchburg Foundry Co., Lynchburg, Va.; Utica Pipe & Foundry Co., Utica, N. Y.; Wood & Co., R. D., Philadelphia, Pa.

The states exhibiting samples of native road building materials, photographs of road work accomplished in various sections and road maps were as follows: Illinois, Minnesota, Indiana, New Jersey, New York, North Carolina, South Carolina, Tennessee and Virginia. The Arizona state exhibit came too late to be available, having been delayed en route. Kansas and Ohio each engaged booths, but did not exhibit. The United States Office of Public Roads presented an exhibit which comprised models of various types of ancient and modern roads and of road machinery in operation.

Investigating Colonial Roads in Brooklyn

Corporation Counsel Watson of New York City, is investigating the ownership of many of the old colonial roads in the suburban sections of Brooklyn, the land of which is now utilized for private purposes.

The question of title presents so many legal complications that it is expected that several months will be required to disentangle it. It may be that an appeal to the courts will be made in order to decide the many complex situations which are involved. Comptroller Prendergast has held up a number of tax sales which include these old roads until a decision is received from the Corporation Counsel.

An exhaustive inquiry and a special report on the question of these colonial roads in Brooklyn was made some years ago by Robert Jordan, one of the examiners in the Finance Department, to Comptroller Metz. According to this report, all the roads laid out by the Dutch during their sovereignty in New York were owned by the government. The city of New York, as successor to that government, therefore, owns such roads in fee unless the ownership has been conveyed. It is held by some able lawyers, however, that the government did not as a rule own the fee of English roads, but held only an easement for road purposes, a revisionary interest remaining in the adjoining owners of either side. As the city has grown, new streets have been extended into territory traversed by old roads, and the usefulness of the old roads, as highways, has, in many cases, ceased. In other instances they have been made a part of the present street system. Upon the abandonment of the old roads, it appears that the lands included within their limits were frequently appropriated to private use. The report goes on to say that titles concerning which there was question were generally cleared by the Sinking Fund Commission by granting a quit claim deed upon the recommendation of the Corporation Counsel. A nominal fee of \$1 with \$100 added for the expense of the investigation was the payment for this deed. Mr. Jordan interpreted the report in this connection, that he did not believe the interests of the city were properly protected.

If it could be shown, the report goes on to state, that the roads were of Dutch origin an important advantage

could be gained. That is why the city has investigated the records. So far, reports have been gratifying.

Some of the old colonial roads of Brooklyn named in Mr. Jordan's report are Bennetts, or Cortelyou Lane, Bennetts or Van Brunts Lane, Brooklyn, Greenwood and Bath Plank Road, Brooklyn, Jamaica and Flatbush Turnpike, Old Bushwick Road, Church Lane or East Broadway, Clove Road, De Bruyns Lane, Gowanus Road, Hunterfly Road, Kings Highway, Kyckout Road, Lotts or Little Lane, Newton and Bushwick Turnpike and Woodpoint Road.

Annual Convention of Michigan State Good Roads Association

The annual convention of the Michigan State Good Roads Association was held at Kalamazoo, September 18 and 19. P. T. Colgrove of Hastings, president of the association, presided. Mayor Hayes of Kalamazoo welcomed the delegates, and a resolution was adopted providing for increasing the number of trustees of the association from five to twelve, so that each Congressional district should be represented.

T. A. Ely, State Highway Commissioner of Michigan, spoke on "The State Highway Department and Its Work." A. G. Batchelder, of New York City, Chairman of the Executive Committee of the American Automobile Association, spoke on "Federal Aid," and George C. Diehl of Buffalo delivered an address on "Highway Construction in New York State." "Road Building in Wayne County" was the subject upon which Edward N. Hines addressed the convention, and Frank F. Rogers spoke on "The Roads of Michigan." W. M. Bryant spoke on "The Use of Prison Labor in Road Construction." Jesse Taylor, Secretary of the Ohio Good Roads Federation, delivered an address on "Rural Folks and Mud Roads."

At the closing session the following resolutions were passed: "Resolved: That a committee of seven members be appointed as a legislative commission to represent the organization and its interests and that a constitutional amendment be submitted to the people of the state providing that all money collected on automobile licenses be taken out of the general fund of the state treasury and given to the State Highway Department for maintenance and construction." It was further recommended that larger appropriations be made to enable the State Highway Commission to pay awards on all improvements. The statement was made that the appropriation for road work was already exhausted and that only 580 miles of roadway had been completed, leaving 600 miles to be finished. Another resolution was passed providing for the revision of the present law to enable villages, cities, townships and counties to bond themselves for the construction of roads, and it was also recommended that a revision of the present law be made for the safeguarding of railroad crossings.

The following officers were elected: President, P. T. Colgrove, Hastings; Vice President, N. P. Hall, Diamondale; Secretary, A. A. Anderson, Hastings; Treasurer, J. Edward Roe, Lansing.

It is considered likely that the next convention will be held in Bay City, Mich.

Supt. Noble of the American Beet Sugar Co. of Rocky Ford, Colo., is trying the experiment of treating the surface of streets with beet syrup, a by-product of the beet sugar industry. The syrup is valued at about \$10 a ton, and is usually sold to farmers for feeding purposes.

Detailed plans for the proposed steel bridges across Lake Washington in the state of Washington, from Bailey Peninsula to Mercer Island and thence to the east shore, have been filed by Chief Deputy Engineer Arthur P. Denton of King County. The cost of these structures, according to Mr. Denton's estimate, will be approximately \$8,000,000.

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No bondholders, mortgagees, or other security holders.

(Signed) E. L. POWERS.

Sworn to and subscribed before me this first day of October, 1912.

(Seal)

LESLIE O. VAN SICKLE,

Notary Public.

(My commission expires March 30, 1913.)

REPORT OF ATLANTIC CITY ROAD CONGRESS

In this issue we present a brief report of the proceedings of the road congress held at Atlantic City, N. J., during the week of September 30. Because of the limited space available in this issue, it has been necessary to limit the present report to a brief synopsis of the proceedings and a list of those participating in the exhibition of road machinery and materials. In the issue of November 2 a more extended account will be printed, and in that issue and that of December 7 a number of the papers presented at the congress will be printed in full.

Report of the Canadian Highway Association

The first quarterly report of the Canadian Highway Association has been submitted to the officers and members by P. W. Luce, Secretary.

The association was organized at a good roads convention, held at New Westminster, B. C., November 3 and 4, 1911. The primary object of the association was to secure support for a project for building a highway throughout Canada. Resolutions were forwarded to Halifax, N. S., Alberni, B. C., Hazelton, B. C., and Dawson, Yukon Territory. Other resolutions calling for federal assistance were sent to Ottawa, while similar resolutions asking for provincial aid were telegraphed to Victoria. These resolutions have been drafted and sent to the different governments and municipalities through which the proposed highway is to pass.

Another project which is indorsed by the association is to have the Canadian section of the Pacific Highway completed. In general, the association has undertaken to promote good roads through the Dominion; to endeavor to have all public moneys expended on roads spent to better advantage; to show the members of Parliament that the people want permanent roads; to carry on a campaign of education in order to enlighten the government and the people regarding the benefits which will be derived from good roads; to cooperate with the different governments with a view to bettering the standard of roads for which federal or provincial grants are made and to capitalize the climate and scenery in building roads that will bring tourists from all parts of the world. Branches are to be established in various sections of the Dominion.

The next annual convention will be held in Winnipeg some time later in 1912. The Duke of Connaught is the patron of the Association and he will be invited to turn the first sod on the first continental road in Winnipeg during the convention.

The route of the proposed highway runs as follows: Alberni to Victoria, via Nanaimo, Vancouver, New Westminster, Chilliwack, Hope, Princeton, Rossland, thence to Trail, crossing the Columbia by the new bridge now in course of erection, and via Summit Creek, along the old Dewdney Trail to Creston, thence following the main Trunk Road into Alberta. From the British Columbia boundary the road will extend almost directly to Macleod, thence to Lethbridge and Medicine Hat, partly over the old surveyed trail and partly on road allowances. From Medicine Hat the route is through Coleridge, Irvine and Walsh, thence on to Maple Creek, just outside the boundary line.

Entering Saskatchewan the road heads almost directly for Swift Current, whence it follows closely the Canadian Pacific Railway to Waldeck, thence east across Lake Chaplin, following the north boundary of township 16 through Moose Jaw to Broadview, and from there following a southeasterly direction, part of the way on surveyed roads paralleling the Canadian Pacific Railway main line to Fleming, thence due east to the Manitoba boundary. In Manitoba the road goes through the cities of Brandon, Portage la Prairie and Winnipeg. The road along the Great Lakes is not yet outlined, but it is the intention to touch at Port Arthur, the Soo, Parry Sound, and then head almost due east for Ottawa. From there the route is towards Montreal, passing probably towards Sherbrooke, where it will swing northeast paralleling the boundary line of the state of Maine, thence through New Brunswick and Nova Scotia to Halifax, touching at Moncton and Truro.

This route is subject to change and several suggestions have been made for modifications. With a view to creating as great an interest as possible in the proposition to establish a Canadian highway, President W. Kerr of the association, has offered gold, silver-gilt and silver medals for competition among children under 18 years of age, to be awarded to those preparing the best essays on the subject "What Good Roads Mean to Canada."

The secretary requests in his report that the members living at a distance supply him with information and photographs of road improvements in their districts. The office of the association is now located at Room 4, Cunningham Block, 614 Columbia St., New Westminster, B. C.

State St., East St. Louis, Ill., is to be paved with vitrified brick at a cost of about \$315,000. This is the widest and longest street in the city.

Warden Coddington of the Kansas State Penitentiary has requested Gov. Studebaker to grant one day's freedom to the state convicts for each day's work on public highways. The Governor's power to commute the sentences of prisoners makes this plan possible if he desires so to act.

Coming Meetings

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

The Commissioner's Court of Avaco, Tex., has ordered an election in Precinct No. 7 at which the taxpayers of that precinct will vote on the proposition of issuing \$100,000 in road bonds.

The \$120,000 good road bond issue, recently authorized in Wood County, Tex., has been sold and active work in improving the highways in Mineola Precinct will commence at once.

The city of Hankow, China, has arranged with the Dollar Steamship Co., which operates between San Francisco and the Orient, for a loan of between \$5,000,000 and \$20,000,000 for improving the streets of the city. Engineers are already engaged on the plans and preliminary work for the modernization of Hankow's streets. It is stated that several miles of wood block pavement are to be laid.

Governor Hunt of Arizona has been petitioned by many of the taxpayers of Globe and the Gila River valley to have state penitentiary convicts build the six miles of uncompleted road between Stanley and Aravaipa, on the edge of the Crook Nation forest in Graham County. It is stated that if this stretch of road is built it will reduce the road mileage between the National Forest District and the nearest railroad point 40 miles.

The date of start of the American Automobile Association's "Lakes to Gulf," or National Reliability tour, from Detroit to New Orleans, has been postponed to October 15. This action was taken as a concession to some of the leading entrants, who desire to use cars of 1913 model and cannot procure them for the earlier date. The delay caused by weather conditions in preparing sections of road included in the route which embrace some stretches of country where highways are now in process of improvement was also considered.

It is reported that the State Highway Commission of Minnesota will authorize contracts for the construction of 2,700 miles of highway in the state next summer. Of this, 700 miles will be entirely new road in the northern part of the state and will be constructed under the Elwell law, enacted at the last session of the state Legislature.

It is reported that work will soon be started on a new high level bridge at Clarke Ave., Cleveland, O. Bonds to the amount of \$500,000 will be issued to defray the cost.

Personal Notes

Frank A. Thurston, Superintendent of Streets of Fall River, Mass., died Sept. 23.

Garrett Pool has been appointed City Engineer of Key West, Fla., at a salary of \$125 a month.

The county highway commission of Madera County, Cal., has recently completed organization. J. B. High is president and F. E. Smith is secretary.

A luncheon was recently tendered G. Howland Leavitt, Superintendent of Highways of the Borough of Queens, New York City, as a tribute to his work on the roads of the borough.

P. E. Stevens, formerly Bridge Engineer of St. Paul, Minn., has become associated with Morgan T. Jones & Co., inspecting and supervising engineers of Chicago, Ill., as manager of the structural steel and cement department.

Trade Notes

The Uvalde Asphalt Co., of New York has purchased a Ruggles-Coles drier for drying sand.

The Taylor Iron & Steel Co., manufacturer of Tisco Manganese Steel, announces the acquisition of the Wm. Wharton Jr. Co., Inc., of Philadelphia, Pa., with works at Philadelphia and Jenkintown, Pa., and its subsidiary corporation, the Philadelphia Roll & Machine Co.

Two new booklets are being distributed by the United States Asphalt Refining Co., 90 West St., New York City. One of these is descriptive of Aztec asphalt for road surfacing and is illustrated by half-tone views of roads in which Aztec asphalt was the material used. The other booklet describes Aztec Liquid Asphalt for oiling roads and is similar to the other in its general purposes and form.

The Modern Construction Co. has been incorporated in Los Angeles, Cal., with a capital stock of \$50,000 for the purpose of conducting a cement and grading contracting business. O. A. Nicholas, W. H. Bispham and B. C. Nichols are incorporators.

The Spray Nozzle Co., of 201 Devonshire St., Boston, Mass., manufacturer of spray nozzles for applying hot asphalt, has issued a twelve page booklet descriptive of its products, and several illustrations are presented, showing various types of asphalt applying machinery equipped with these nozzles, and of the Spray Nozzle Road Machine, which is also manufactured by the company.

A very attractive booklet, printed in colors, has just been issued by the Universal Portland Cement Co. of Chicago, Ill. Most of the booklet is given over to illustrations and descriptions of highway bridges in which Universal Portland cement was used. The inside pages of the booklet are printed in either two or three colors and the cover is printed in four colors in pastelle effect, showing an impressionistic view of a concrete bridge.

The Barron & Cole Co. of 127 Franklin St., New York City, is distributing two new catalogues describing the various products for which the company is the selling agent. One of these includes illustrated matter descriptive of the four wheel scraper sold by the company and some of the results of its work. Tables are given showing the cost of the outfit on the various jobs and the amount of work which can be accomplished in a given time at a given cost by the use of the scraper. The other booklet describes the Peerless Pick-Up hand sweeper for street cleaning purposes. This booklet is also illustrated and contains testimonials from various users of the machine.

The Kent Machine Co., of Kent, O., has published and is distributing among the trade a booklet describing the Kent Precision Mixers. The pamphlet comprises 34 pages and cover. It is attractively compiled and elaborately illustrated with views of the Kent Precision Mixer in operation, and silhouettes, halftones and line cuts of the various types of the machine itself and its several parts. The capacity of the machine ranges from 5 to 6 cu. yds. to 15 to 17 cu. yds. of rammed concrete per hour for the machine mounted upon wheels, and from 4 to 5 cu. yds. to 14 to 16 cu. yds. per hour for the stationary machine. The Kent Mortar Mixer is also described.

CONTRACT NEWS

ROADS AND STREETS.

Contracts Pending

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10-14 Glendale, Cal., street work.....	10-12
10-14 Bakersfield, Cal., street work.....	10-12
10-14 Boonville, Miss., road imp.....	10-12
10-15 Harrisburg, Pa., state roads.....	10-5
10-21 Sacramento, Cal., state highway work.....	10-12
10-21 Montgomery, Ala., grad. draining-gravel road.....	10-12
10-22 Linden, Ala., grading, sand clay surfacing.....	10-12
10-25 Cincinnati, O., road repairs.....	10-12

BRIDGES.

10-14 Albany, N. Y., bridge constr.....	10-5
10-14 South Bend, Ind., flat top beam bridge.....	10-12
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10-15 Lima, O., concrete arch.....	9-28
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10-18 Paulding, O., bridge work.....	10-12
10-18 Santa Fe, N. M., bridge.....	9-11
10-22 Shreveport, La., bridge.....	10-12
10-23 Cleveland, O., steel bridge.....	10-12
10-23 Ft. Worth, Tex., 2 reinforced con. viaducts.....	10-5
10-24 Upper Sandusky, O., 2 steel superstructures.....	10-12
10-24 Butler, Ga., reinf. con. bridge.....	10-12
10-25 Cincinnati, O., bridge.....	10-12
10-25 Columbus, O., culvert and approaches.....	10-12
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11-11 Huntsville, Tex., 2 steel bridges.....	9-21

MISCELLANEOUS.

10-14 Smithville, Tex., good road bonds.....	9-28
10-15 Jacksonville, Fla., bonds.....	9-14
10-15 Milton, Fla., bridge bonds.....	10-5
10-15 Flint, Mich., bonds.....	10-12
10-26 Dayton, O., bridge bonds.....	9-28

ROADS AND STREETS.

Bids Asked and Prospective.

Linden, Ala.—Bids will be received by Court of Co. Cmsrs. of Marengo Co. at Court House, Linden, at 10 a. m., Oct. 22, 1912, for grading and surfacing with sand clay approximately four miles of road. Amount to be expended, \$8,000. W. S. Keller is State highway engineer.

Montgomery, Ala.—Bids will be received by the Court of Co. Cmsrs. of Perry Co. at Marion, Ala., until 2 p. m., Oct. 21, 1912, for grading, draining and surfacing with gravel four miles of the Burroughs Ferry Road.

The council is planning to pave sidewalks on Pine St. Address A. R. Gilchrist, City Engr.

Bakersfield, Cal.—Bids will be received up to Oct. 14, by the Board of City Trustees for the paving of the following streets and the construction of cement curbs and gutters thereon: B St., between 16th and 19th, four blocks, oil macadam; B St., between 19th and 24th, five blocks, asphalt; C St., between 16th and 24th, nine blocks oil macadam; 24th St., between Chester and L, two blocks, oil macadam; 25th St., between Chester and L, two blocks, oil macadam; 23d St., between Chester and L, two blocks, oil macadam; Truxton Ave., L to Union, eleven blocks, oil macadam; Truxton Ave., Chester to L, two blocks, macadam; Truxton Ave., from Chester to A, nine blocks, asphalt; F St., between California and 15th, three blocks, asphalt; 20th St., in Dist. No. 3, six blocks, asphalt; Orange St., between Oleander and H, four blocks, asphalt. The total work comprises 29 blocks of asphalt paving, 34 blocks of oil macadam and 10 blocks of cement sidewalk. H. F. Murdock is City Clerk.

The Co. Bd. of Spvs. of Kern Co. is contemplating the construction of an oil macadam road from the Bakersfield city limits to the bridge.

Fresno, Cal.—The Bd. of Spvs. is considering plans for the construction of an oil macadam pavement for five-eighths of a mile on Olive Ave. to the Normal school. The cost is estimated at \$9,000.

Glendale, Cal.—Bids will be received by the City Clerk until Oct. 14 for improving 1,000 ft. of Maryland Ave., from the north line of Doran St., roadway 40 ft. wide. The work will consist of grading and oiling, cement curbs, and 5-ft. cement sidewalks along each side of the street. Also for improving 1,450 lin. ft. of 36-ft. roadway in Doran St., between Central Ave. and Louise St. The work consists of grad-

ing and oiling 1,000 lin. ft. of cement curbs and 5-ft. cement sidewalks. Plans and specifications on file in the office of City Engr. Edw. M. Lynch, City Hall. G. B. Woodberry is City Clerk.

Imperial, Cal.—The Bd. of Trustees has passed resolutions of intention for paving the streets of the city. Asphalt pavement with concrete base will probably be used.

Porterville, Cal.—Of the \$40,000 raised for mountain roads in all sections of Tulare Co., \$8,000 will be spent in the completion of the Mineral King road, and \$12,000 for the road in Dinuba. About \$20,000 will be expended on the mountain roads of this district. For the construction of the road to Hot Springs from the valley, \$15,000 will be appropriated and for the Tule river, near the foothills, \$5,000 is to be spent.

Sacramento, Cal.—Bids will be received by the Cal. state highway commission, Forum Bld., Sacramento, up to Oct. 21, for the improvement of the following highways: A portion of the state highway in Los Angeles Co., between Co. Highway No. 3 and Rancho El Encino, Div. 7, Route 2, Sec. A, about 6½ miles in length, to be built of Portland cement concrete and bituminized surface; also for constructing a portion of the state highway in Santa Clara Co., between Palo Alto and Stevens Creek Bridge, being that part from station 4400 to station 393x50 of state highway layout No. 8, Div. 4, Route 2, Sec. A, 6½ miles in length to be built of macadam with asphalt wearing surface; also for constructing a portion of the state highway in Sonoma Co., between Healdsburg and Santa Rosa, Div. 4, Route 1, Sec. B, 14 miles in length, to be built of Portland cement concrete and bituminized surface; also for constructing a portion of a state highway in Santa Clara Co., between the Stevens Creek Bridge and 900 ft. easterly from the Lawrence Station Saratoga Road, being that part from station 393x50 to station 386x40 of state highway layout No. 8, Div. 4, Route 2, Sec. A, about 5 5-10 miles in length, to be built of Portland cement concrete with bituminized surface.

San Diego, Cal.—The Homeland Improvement Co. will let the contract at once for the construction of cement curbs, gutters and sidewalks in a 21-acre tract in Point Loma. Streets are now being graded.

San Francisco, Cal.—The Bd. of Pub. Works has recommended to the Spvs. the paving of Geary St., between 11th and 12th Aves.; 27th Ave., between Lake and West Clay Sts., and Greenwich St., between Polk St. and Van Ness Ave. The Bd. also asks that \$36,300 be made available to pave 13th and 14th Aves., fronting the Presidio Parkway.

The Bd. of Pub. Works has granted permission to property owners to do street work under private contract at the following locations: Westerly half of 14th Ave., between Geary and Anza Sts., curbs and pavement; Buena Vista Ave., between Congress St. and Park Hill Ave., paving; crossing of Maynard and Grant Sts., paving; Beale St., between Polson and Bryant Sts., grading and paving; 20th St., between Church and Sanchez Sts., curbing and paving; Anza St., between 20th and 21st Aves., curbing and paving; crossing of 17th and Kansas Sts., paving, etc.; Beale St., between Bryant and Brannan Sts., grading and paving; Quintara St., between 15th and 16th Aves., grading, paving, etc.; Lawton St., between 45th and 46th Aves., curbing and paving; Quintara St., between 16th and 19th Aves., grading and paving; Mateo St., between Laidley and Chenery Sts., grading and paving.

The Bd. of Pub. Works has granted permission to property owners to perform street work at the following locations: Curbing and paving Moraga St., between 12th and 13th Aves.; Spencer alley, between 16th St. and its northerly termination; 9th Ave., between Cabrillo and Fulton Sts.; Athens St., between Persia and Russia Aves. and 44th Ave., between Clement St. and Point Lobos Ave. Grading, sewerage, paving, etc., 23d St., between Hoffman and Grand View Aves. Grading and curbing, Maynard St. (formerly Marshall). Grading Cabrillo St., between 19th and 20th Aves.

Santa Barbara, Cal.—The City Council has adopted the district assessment method of providing funds for the proposed street improvements, and plans for the work will be prepared at once by the City Engr. The work comprises 9½ miles of paving at an estimated cost of \$321,000.

macadam of Sixth Ave., from Rose to California Ave., and the construction of cement sidewalks, curbs, a concrete retaining wall, and a 20-in. vitrified pipe storm drain.

High Springs, Fla.—\$7,500 will be expended paving sidewalks with concrete. Address City Clerk.

Cicero, Ill.—Bids will be received Oct. 14 for repairing the present macadam foundation and resurfacing South 48th Court and South 49th Ave. from 12th to 16th Sts., according to plans and specifications for said improvement on file in the office of the Bd. of Loc. Imps. Address George Comerford, Pres. of the Bd.

Venice, Cal.—The Bd. of Trustees has ordered the paving and grading with oil

Hooperstown, Ill.—The council is planning to pave Penn St. Address City Clerk.

Rock Island, Ill.—Construction of 70 blocks of new concrete sidewalks is contemplated. Address City Engr.

Streator, Ill.—Supplementary assessment ordinances to make up for the deficit for paving West Main and Water Sts. have been passed by the City Council.

Davenport, Ia.—At a meeting of the Bd. of Loc. Imps. a resolution was adopted recommending the improvement of sidewalks. Over 70 blocks of concrete walks will be laid. Address City Engr. Trefchler.

Winnfield, La.—The Bd. of Aldermen ordered the paving of about five miles of sidewalk at once. The board also ordered the purchase of a traction engine to grade the road leading into the city.

Petoskey, Mich.—In the annual budget of the City Council provision is made for 23 blocks of pavement to be built next Spring. Address City Clerk.

Booneville, Miss.—Sealed proposals will be received by the Highway Cmsrs. of Spvs. Dist. No. 1 of Prentiss Co. until 10 o'clock a. m., Oct. 14, for the permanent improvement of approximately 25 miles of roads in said district. W. P. Enis, Dist. No. 1, Prentiss Co.

Great Falls, Mont.—The council is planning to pave portions of 23rd and 4th Aves. Address City Clerk Harrison.

Akron, O.—An ordinance has been passed determining to proceed with the improvement of Westwood Ave., between Crosby and Maple Sts., by grading, curbing and paving.

Alliance, O.—An ordinance has been passed by the City Council authorizing the levying of a special tax to pay the cost of grading, draining, setting curb and paving with brick W. Hartshorn St., from Union Ave. to Rock Hill Road.

An ordinance has been passed authorizing the levying of a special tax to pay the cost of grading, draining, setting curbs and paving with brick South Arch Ave. from S. L. State St. to N. L. L. Mill St.

Canton, O.—A resolution has been passed by the City Council declaring it necessary to improve Marvin Ave. from Garnet St. to Fulton St. by grading, setting curb, laying flag stone sidewalks, vitrified block cross walks and gutter and paving and draining.

Cincinnati, O.—Bids will be received Oct. 25 for repairs on Springfield Pike, between Wyoming and Glendale in Springfield Twp. Address Stanley Struble, Pres.

Dayton, O.—An ordinance has been passed authorizing the levying of special assessments for the improvement of June St. from 5th to 2nd Sts.

An ordinance has been passed authorizing the levying of special assessments for the improvement of Mead St., from Carrie St. to the levee.

Lima, O.—The City Council has passed an ordinance levying a special assessment for the improvement of Nye St., between Elm St. and Spencerville Road by paving with stone macadam treated with Bermudez asphalt and constructing cement curbs and gutters.

Springfield, O.—The City Council has passed ordinances declaring it necessary to improve the roadway of High St. from the east property line of Ragensperger Ave. to the east right of way of the D. T. & I. R. R., by paving with sheet asphalt, asphalt block, asphalt concrete, asphaltic macadam, bitulithic, petripalt, granitoid block, wooden block or vitrified paving brick or block, constructing curb and gutter and grading; also for improving the roadway of High St., between the east property line of Belmont Ave. and the east property line of Ragensperger Ave., by repaving it with sheet asphalt, asphalt

block, asphaltic concrete, asphaltic macadam, bitulithic, petripalt, granitoid block, wooden blocks or vitrified paving bricks.

Pittsburgh, Pa.—The following ordinances have been passed by the City Council. Directing the grading, paving and curbing of Louisa St., from Bouquet to Atwood Sts., the grading, paving and curbing of Merritt St., from Taggart St. to a point 340 feet northwesterly; grading, paving and curbing Rockledge St. from Demas St. to the north line of Miles alley; grading, paving and curbing of Lloyd St., from Reynolds St. to the north line of Robinson and Dickie Plan; directing the grading, draining, and curbing of Hoeveler St. from Everett St. to a point 62.60 feet northwest of Omega St. Authorizing the grading, paving and curbing of Kirkpatrick St. from Bedford Ave. to Grant Blvd.; authorizing the grading, paving and curbing of Hoeveler St. from Collins Ave. to a point 72.65 feet southeast of Culver St.; authorizing the grading, paving and curbing of Howe St., from North Dennison Ave. to Festival St.

Wenatchee, Wash.—Bids will soon be called for the paving of about 40,000 square yards of streets in the business districts with creosoted wood blocks, bitulithic brick or other suitable kinds of pavement. F. C. Powell is City Engr.

Bids Received and Contracts Awarded.

Gleendale, Cal.—McCombs Bros. have been awarded the contract for improving Vine St., from Central Ave. to the San Francisco Road at 30c. per lin. ft. for grading, 3½c. per sq. ft. for oiling and macadam, 21c. per lin. ft. for cement curb, 7½c. per sq. ft. for cement sidewalks.

Los Angeles, Cal.—The following contract bids were awarded by the Bd. of Pub. Works: For improving Commonwealth Ave., between Temple and Melrose Aves., to Frank Gillespie, at \$2.50 per lin. ft. for grading and graveling complete; 36c. per lin. ft. for cement curb; 16c. per sq. ft. for cement gutter; 30c. per sq. ft. for vit. block gutter; 50c. per sq. ft. for granite block gutter; 12c. per sq. ft. for cement sidewalk; \$500 for storm drains; aggregate \$13,797.03. The Barber Asphalt Co., for improving Westlake Ave., from Pico St. to Alvarado St., at 17c. per sq. ft. for asphalt paving; 40c. per lin. ft. for cement curb; 14.2c. per sq. ft. for cement gutter; aggregate amount, \$3,487.15. The Fairchild Gilmore Wilton Co., for improving Channing St., from 7th to Atlantic Sts., at 20c. per sq. ft. for asphalt paving, 20c. per sq. ft. for repaving; 43c. per sq. ft. for granite block gutters; aggregate \$5,254.59.

The Barber Asphalt Paving Co. was awarded the contract for improving Adams St., from Sixth Ave. to west city boundary at 18.2c. per sq. ft. for asphalt paving; 35c. per lin. ft. for cement curb; 14.9c. per sq. ft. for cement gutter; 43.6c. per sq. ft. for granite block gutter; \$25.25 for storm drains; aggregate, \$24,670.97.

H. H. Curtis was awarded the contract for improving La Brea Ave. from Sunset Blvd. to the south city boundary line at \$1.75 per lin. ft. for grading and graveling; 8c. per sq. ft. for reggrading, reggrading and rerolling; 15c. per sq. ft. for cement gutter; 40c. per sq. ft. for granite block gutter; 12c. per sq. ft. for sidewalk; \$100 for storm drains, and 25c. per lin. ft. for cement curb; aggregate, \$4,968.13.

B. F. Ford was awarded the contract for improving Maple Ave., from Seventh to Washington Sts., at 18c. per sq. ft. for asphalt paving; \$4,058 for reinforced concrete culverts; 33c. per lin. ft. for cement curb; 30c. per sq. ft. for vitrified block gutter; 40c. per sq. ft. for granite block gutter; aggregate, \$24,416.89.

Benj. F. Ford was awarded the contract for improving 38th St. from Central Ave. to the east city limits at 18c. for asphalt paving, 23c. for cement curb, 40c. for granite block gutter, 11c. for sidewalk, \$1,850 for culverts; total, \$34,109.

Frank Gillespie was awarded the contract at \$13.797 for grading and graveling, cement curbs and gutters, vitrified block and granite block gutters, sidewalks, and storm drains, on Monroe St., between Hoover and Virgil.

John Radich was the lowest bidder at 42c. per lin. ft. for the construction of cement curbs in Road District No. 11, Sherman, Cal. The other bids received were Geo. R. Curtis, 45c., and C. G. Cummings, 42.7c. The bids were taken under advisement.

John Radich was the lowest bidder at 14c. per sq. ft. for the construction of cement sidewalks in Road District No. 11, Sherman, Cal. The others received by the Bd. of Supvs. were: C. G. Cummings, 14.4c., and Geo. R. Curtis, 16c. The bids were taken under advisement.

The following bids were received by the Bd. of Pub. Works for improving Cen-

ter St., between Aliso and First Sts.: Fairchild-Gilmore-Wilton Co., 17c. for paving, 30c. for cement curb, 40c. for granite block gutter, \$2,530 for storm sewer system and appurtenances. Barber Asphalt Paving Co., 18.2c. for paving, 40c. for cement curb, 44.1c. for granite block gutter, and \$3,325 for storm sewers.

Pasadena, Cal.—J. E. Haddock was lowest bidder for improving Marengo Ave. at 44c. for grading, 26½c. for curb, 14c. for gutter, 5½c. for paving, 19c. for sidewalk; total, \$12,389.

Sacramento, Cal.—Burns, Clark & Darsa, of Sacramento, were the low bidders at \$59,629 for constructing 10 miles of state highway in Placer Co., between south county line and Lincoln, Div. 3, Route E, Sec. A, also 1 9-10 miles in Sacramento Co., between Auburn Road and the county line, Div. 3, Route E, Sec. A, at \$9.15.

The Worswick Street Paving Co. of Fresno, was low bidder at \$57,594 for constructing 10 miles in Merced Co., between Arena and Merced, of state road Div. 6, Route 4, Sec. C.

Lafayette, Ind.—A contract has been awarded by the Town Bd. for building a cement sidewalk on the north side of De Hart St., between Salisbury and Robinson Sts., to a local contractor named Bruce, at 59½c. per lin. front ft.

Hamburg, Ia.—The City Council has let the contract for 33,000 sq. yds. of paving to The Waterloo Paving Co., at \$1.65 per yd.

Great Falls, Mont.—Bids for the construction of the proposed bitulithic pavement on Third Ave., north between Sixth and Seventh Aves., were received as follows: Warren Const. Co., \$4,015.98; Nilson Smith Co., \$4,104.47. The contract was awarded to the Warren Const. Co.

Cincinnati, O.—The Co. Cmrs. awarded the contract for the improvement of Clough Creek Pike from Batavia Pike to Bogart Road to Van Camp Bros. on their bid of \$10,746. The contract for a concrete bridge on the Cincinnati and Dayton Pike in the village of Sharonville was awarded to A. H. Döbel on a bid of \$2,361.

Columbus, O.—The following contracts have been awarded by James R. Marker, State Highway Commissioner for state road work: Grading and paving with waterbound macadam the Selma Road in Springfield Twp., Clark Co., length, 5,280 ft., width, 16 ft.; Wm. F. Payne, Springfield, O., \$5,756.60; grading and paving with bituminous surface treated concrete, the Scio Road in North and Rumley Twp., Harrison Co., length, 13,600 ft., width, 10 ft.; McMath & Kelly, Freeport, O., \$23,283; grading and paving with waterbound macadam, section 2 of the Medina-Wooster Road in Guilford Twp., Medina Co., length, 5,545 ft., width, 10 ft.; Geo. S. Mellert, Medina, O., at \$5,850; grading and paving with a bituminous surface treated concrete pavement the Geneva Road in Geneva Twp., Ashtabula Co., length, 5,280 ft., width, 16 ft.; B. F. Hewitt, Jefferson, O., at \$9,746.

Portsmouth, O.—The following bids have been received for street paving: S. Monroe & Sons, \$1.09 per sq. yd.; Kelly Bros., \$1.14; Kaps Bros., \$1.17; Grimes & Seymour, \$1.33. All paving will be of concrete base with tar filler. The streets to be paved under the contracts are as follows. Three squares of Grandview Ave., between 17th and 20th Sts.; four squares on 19th St., between Hutchins and Grandview Aves.; four squares on Home Ave., between Band and High Aves., and two squares on Logan St., between Chillicothe Road and Hutchins Ave.

Portage, Pa.—The contract for the paving of Main St., Portage, was awarded by the Portage Council to Anstead Shirk & Co., of Gallitzin on a bid of \$2.29 per sq. yd.

Colfax, Wash.—The Council let a contract to the Warren Const. Co. for the paving of a new district comprising several blocks on Cooper and Thorn Sts. with Warrentite. The price was \$7,116.

BRIDGES.

Bids Asked and Prospective Work.

Oakland, Cal.—City Engr. P. F. Brown is preparing working drawings for the construction of the new Eighth St. bridge. An appropriation of \$35,000 has been made for the construction of this bridge, which will be 60 ft. wide and 110 ft. long, of concrete and steel construction. Plans will be ready for contractors in two months.

Santa Barbara, Cal.—Engineers Mayberry and Parker, P. E. Bds., Los Angeles, have been commissioned to prepare plans for a reinforced concrete bridge across

Mission Creek at Haley St., and also for a similar structure at the Coast Highway.

Butler, Ga.—Bids will be received Oct. 24 for constructing a reinforced concrete bridge, 250 ft. long across Patsiliga Creek, about one mile north of Reynolds. Address T. D. Seay.

Chicago, Ill.—At a recent meeting of the Sanitary Bd. the residents of the Fifth Ward petitioned for a bridge across the Canal. Address Compt. McGann.

The Council is considering the matter of building a bridge across the Chicago River at Monroe St. Address Cont. McGann.

Shreveport, La.—Bids will be received Oct. 22 for building the superstructure of a street traffic bridge over the Red River at Shreveport as per plans and specifications on file in the City Engineer's office, and at office of Hedrick and Cochrane consulting engineers, 1118 McGee St., Kansas City, Mo. Address L. H. Baker, Secy.

Grand Haven, Mich.—The question of building a new Grand Haven River bridge is being considered. Address Mayor Cotton.

Canton, O.—Bids will be received Oct. 16 for furnishing the labor and material for the construction of the following bridges: East Eighth St. substructure, East Eighth St. superstructure and Navarre St. bridge, in accordance with plans and specifications now on file in the office of the Aud. of Stark Co. The Bd. of Stark Co. Cmrs. are also inviting proposals on any other plans at the option of the bidders. Address J. H. McConnell, Aud.

Cincinnati, O.—Bids will be received Oct. 25 for the construction of a bridge over Mill Creek on Clark Road, in Sycamore Twp. The work to be done according to the plans and specifications now on file in the office of the Bd. of Co. Cmrs. Address Stanley Struble, Pres.

Cleveland, O.—Bids will be received Oct. 30 for performing the labor and furnishing the material for the construction of the secondary piers Nos. 1 to 11, inclusive, of the Detroit Superior Bridge. Address John F. Goldenbogen, Clerk of Cuyahoga Co. Bd.

Sealed proposals will be received at the office of the Bd. of Cmrs. of Cuyahoga Co. until 11 o'clock a. m., Oct. 23, for the construction of a steel bridge.

Co. Engineer Frank Lander of Cuyahoga Co. will prepare plans for a \$500,000 bridge at W. 25th St.

Columbus, O.—Bids will be received Oct. 25 for constructing a culvert and approaches on the Kilbourne Road. Plans and specifications and estimates of quantities for doing this work are on file in the offices of the Co. Aud., and Co. Surv. of Franklin Co. Address F. M. Sayre, Co. Aud.

Lima, O.—Sealed bids will be received by the Bd. Co. Cmrs. of Allen Co. at Lima, until Oct. 15 for the construction of a concrete arch bridge over the Flat Fork Creek at 3rd St., Delphos. C. R. Phillips, Clk. of the Board.

Paulding, O.—Sealed bids will be received by S. O. Jackson, Chairman of the Co. Cmrs. of Paulding Co., at Paulding, until Oct. 18, for the following bridge work: Two 140-ft. spans, 18 ft. wide with creosoted plank and block floor over the Anglaize River near Junction, also steel joists and creosoted plank and block floor for the three 140-ft. spans of this bridge now standing; a steel bridge 43-ft. span, 16 ft. wide over Prairie Creek, between Section 17 and 20 in Latty Twp. and a 32-ft. steel span 16 ft. wide concrete abutments over Prairie Creek between Section 25, Blue Creek, and Section 30, Latty Twp.

Upper Sandusky, O.—Sealed proposals will be received at the City Auditor's office until noon, Oct. 24, 1912, for the furnishing of material and erecting of two new steel bridge superstructures. Peter Frank, Jr., is Auditor.

Lorain, O.—Sealed proposals will be received at the office of the Bd. of Cmrs. of Lorain Co. until one p. m., Oct. 14, for furnishing material and labor for constructing a new abutment for the Reid bridge in Columbus Twp., located on Parks Road, in accordance with the plans and specification to be furnished by T. L. Gibson, Co. Surv.

Sealed proposals will be received at the office of the Bd. of Co. Cmrs. of Lorain Co. until 1 p. m., Oct. 14, for furnishing material and labor for constructing an extension to arch bridge in Amherst Twp., located on the telegraph road in South Amherst in accordance with plans and specifications to be furnished by T. L. Gibson, Co. Surv.

GOOD ROADS

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Annual Convention of the Illinois Highway Improvement Association

The first annual convention of the Illinois Highway Improvement Association was held at the Jefferson Hotel and Coliseum, Peoria, September 27.

The first session of the convention opened at ten o'clock in the morning, with over 200 delegates present from various parts of the state. The purposes of the meeting were the adoption of some uniform idea as to what is required to better the general conditions of the Illinois roads, the type of road best adapted to conditions, and the most feasible method of attaining these ends.

A committee on policy was appointed several months ago, and the principal features of the convention were the reading of the report of this committee, the discussion of the report and the adoption of a definite policy by which the association should carry on its work.

The program was as follows: 10 a. m., group gatherings, Jefferson Hotel; noon, luncheon, main business session, Jefferson Hotel; address of welcome to delegates, Hon. E. N. Woodruff, Mayor of Peoria; report of committee on policy containing outline of platform of the association; discussion of the report by Hon. A. P. Grout, President, Illinois Farmers' Institute; Hon. Oliver Wilson, Master of the National Grange; Hon. Edwin R. Wright, President of the Illinois Federation of Labor; Hon. Chas. J. Piez, President of the Illinois Manufacturers' Association; D. Ward King, J. D. Phillips, the newly elected president of the Illinois Bankers' Association; S. E. Bradt, Highway Commissioner of DeKalb; A. G. Batchelder, Chairman of the Executive Committee of the American Automobile Association; Mrs. H. M. Dunlap, Savoy, Ill.; Hon. Eugene Kimbark, President of the Chicago Association of Commerce; Hon. Homer J. Tice, Greenvlew, Ill.; Hon. C. E. Hearn, Quincy, Ill.; W. E. Howe, Attorney, Highway Commissioners' Association, and John D. Shoop, President of the Illinois State Teachers' Association. General discussion by delegates. Vote on report. Report of committee on constitution. Reports of officers, 8 P. M., mass meeting at the Coliseum. Address on, "The Press and Good Roads." Address on the subject, "Road Building in Colorado," illustrated by moving pictures, by Warden Thomas J. Tynan of the Colorado State Penitentiary. Address on the subject, "Good Roads," by Jesse Taylor, Secretary of the Ohio Good Roads Federation. Reading of platform.

The report of the committee on policy stated that "Illinois," foremost among the states in natural resources, finds her general welfare retarded by a system of wretched public highways, constructed, maintained and administered under a method in vogue centuries ago and unadapted to the problems presented by modern traffic and out of harmony with the advancement of the state in other directions." Comparison was made between the state of Illinois and neighboring states in the matter of road improvement. The report further stated that a great network of 95,000 miles of country wagon roads was left to the haphazard

methods of 4,800 highway commissioners, working independently of each other, poorly paid, generally inexperienced, and provided with inadequate funds. It was also stated in the report that careful investigation had shown that of the \$7,000,000 expended annually on Illinois wagon roads, "approximately 37½ per cent. is wasted, and in some townships a much greater percentage is spent without permanent benefit. Illinois must abandon a road system which is complex, wasteful and inefficient." It was further remarked in the report that highway improvement was no longer a purely local matter, but one in which the citizens were interested to such an extent that the state should assist in solving the problem which the bad roads present to the people. Federal aid in the construction and maintenance of post roads and transcontinental highways was favored. An annual good roads day to be designated by the governor or by the legislature was recommended, on which the attention of the whole people, especially teachers and children in the normal schools, should be directed to the importance of improved wagon roads. The advantages of good roads were set forth at length in the report. The following recommendations were made in the matter of state legislation:

1. State and county cooperation in the construction and maintenance of main highways and bridges.
2. A non-political state highway commission of at least three competent members, who shall devote their entire time to their duties.
3. Improvement (in such counties as elect to come under the provisions of the law) of main, continuous, county highways connecting county seats and important cities, principally at the expense of the state and the county; such roads to be selected and improved by county authorities, subject to the approval of the state highway commission and after improvement to be turned over to the state for perpetual maintenance.
4. Improvement, maintenance and control of remaining roads (about 80 per cent. of the whole) under supervision of county and township authorities.
5. Measures to guarantee maintenance after roads are once constructed.
6. Use of the state automobile tax, together with such other funds as the legislature may appropriate, in the improvement of highways.
7. Extension of the employment of prisoners in state institutions in the preparation of material for road building, and the use of state prisoners—under state direction—on an honor system, in actual road work when practicable.
8. Payment of all road taxes in cash.
9. Compulsory dragging of all dirt roads.
10. Safety of road users, such as "Rules of the Road," and the proper construction and guarding of crossings at railroads and intersections of streets and highways.

A discussion of these recommendations which constituted the platform of the association as formed by the committee on policy, occupied the entire afternoon session, after which the platform was unanimously adopted by the association. It is stated that an effort will be made to get every state organization which is in any way interested

in the betterment of Illinois highways to endorse this platform.

A meeting of the representatives of a number of journals and newspapers from various parts of the state of Illinois was held in the morning as one of the features of the convention, and various methods of giving publicity to the good roads movement were discussed. Although no official action was taken, each man present pledged himself to do his part in spreading the propaganda of good roads.

A meeting of the Illinois Manufacturers' Association was also held, and the problem that confronts Illinois in the matter of good roads was discussed at length, the members expressing themselves in favor of any action that may lead to the realization of the hopes of those interested in the betterment of road conditions in the state.

Grade Crossing Law Declared Invalid

In an opinion handed down by Chief Justice Gummere, of the Supreme Court of the state of New Jersey, it is declared that the so-called Pierce grade crossing law, enacted at the last session of the Legislature and passed over the veto of the governor, is unconstitutional.

The reason for the invalidity of the law is stated in the opinion to be that the bill was not returned to the Legislature by Governor Wilson within the five day limit prescribed by the constitution in the case of vetoed measures. The court holds that because of an adjournment for more than five days, which was made at that time by the Legislature, the return of the bill within the limit was impossible. The Legislature, early in April of the current year, adjourned for ten days to give the governor an opportunity to pass on the bills before him, and reconvened ten days later to finish up its business. Accordingly, this law, among others submitted to the governor and disapproved by him at that time, did not come back within the five days and is therefore declared to be dead by Justice Gummere.

A serious question now arises as to whether several other bills, which were vetoed by the governor at that time but which were passed over his veto, one of which is the state highway law now in force, are not invalid for the same reason.

Judge Gummere, after quoting the provisions of the constitution, requiring the governor to send bills back to the Legislature after five days if he disapproves, then said: "We conclude, therefore, that by force of the constitutional provision under consideration, the adjournment of the House in which the bill originates, after such bill has been presented to the governor, subsequent to final passage after his approval or disapproval, if it continues for more than five days after the bill shall have been presented to the governor, prevents the return of the bill to the executive by the House of origin within that period, that the fact of such prevention is to absolutely destroy the validity of the bill, for the constitutional provision recited declares that when the Legislature, by its adjournment, has prevented the return of such a bill by the governor within the five days, it shall not become a law."

Road Through the Snoqualmie Pass

As a result of a recent tour of inspection of the proposed Snoqualmie Pass route in Washington, made by State Highway Commissioner W. J. Roberts, County Engineer C. T. Jordan of Kittitas County and County Engineer J. R. Morrison of King County, recommendation will be made that a road be built through the pass and that the Legislature appropriate \$500,000 to defray expenses. This will provide a modern highway across the Cascade Mountains, connecting the east with the west.

According to the State Highway Commissioner the Snoqualmie Pass route is the only feasible one in the state. Steven's Pass, which has been considered, has been eliminated from the possibilities, according to Mr. Roberts, who made the statement that engineers connected with the State Highway Commission had been over the route and found that although the Great Northern switchback, built several years ago, but now abandoned, could be used as a road, there was no road leading up to the switchback from either side, and as the citizens of Chelan County did not seem inclined to make a survey of the project, he did not think enough of it to make an investigation.

According to a statement by County Engineer Jordan of Kittitas County, there are about 28 miles of road to be constructed from North Bend to the summit of the range, and a stretch of this 4 miles long is already in good shape. On the Kittitas County side only 7 miles will have to be built, and from Easton west, 14 miles are finished. The road from Easton to Cle Elum and thence on to Ellensburg is already in fair shape and with the reduction of a few grades the road can be made one of the best in the state. In all there remain but 31 miles of the road to be constructed in the mountains, and of this 22 miles would be comparatively easy work. For 9 miles the road will be built through rock, and will cost approximately \$25,000 a mile. Snoqualmie Pass is more than 1,000 ft. lower than any other pass across the Cascades, as it crosses the mountains at an elevation of 3,000 ft., while Steven's Pass is 4,061 ft. and Natches Pass is at an elevation of 4,823 ft.

Highway Work in Wisconsin

According to a statement by A. R. Hirst, State Highway Engineer of Wisconsin, every county in the state will apply for state aid during 1913, which will be the second year under the state aid law. In 1912, 65 counties out of 71 applied for state aid. All of the counties have already made application for 1913, and most of the counties which received the benefits of the law in 1912 have largely increased their appropriations for the coming year, thereby increasing the sums of money which they will receive from the state in a proportionate ratio.

Dane County, which appropriated \$30,460 this year, has appropriated \$47,720 for 1913. Douglas County with \$6,020 for 1912 will have \$15,400 in 1913. Fond du Lac, which appropriated \$2,750 in 1912, will expend \$12,650 next year. Milwaukee County increases its road fund from \$76,000 for 1912 to \$83,670 for 1913. Monroe County's increase will be from \$4,200 in 1912 to \$21,800 next year. Outagamie, which appropriated \$400 in 1912, has appropriated \$5,900 for 1913. Sauk County has increased its appropriation from \$26,430 in 1912 to \$40,500 in 1913. Vilas County, which appropriated nothing in 1912, has appropriated \$20,000 for use next year, and Price County has increased its appropriation from \$500 in 1912 to \$6,909 in 1913.

The total cost per capita of the state aid roads built in the state in 1912 was \$9.61. The total cost per \$1,000 of assessed valuation was 44 cts., and the total cost per square mile of territory was \$24.25. Florence County leads with an appropriation of \$9.91 per capita and \$8.17 for each \$1,000 assessed valuation. Milwaukee appropriated 52 cts. per capita and 30 cts. per \$1,000 assessed valuation. At the same time Milwaukee County leads the others in the amount expended per square mile of territory, the figures showing an appropriation of \$992 per square mile. Ashland County is second in per capita expenditure with \$2.19; Bayfield third with \$1.91. Sauk County, which was a pioneer in the state in road work, is fourth with \$1.83.

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Annual Convention of the Canadian Highway Association

The second annual convention of the Canadian Highway Association was held at Winnipeg, October 10, 11 and 12. The aims and objects of the association and the proposed transcontinental highway which the association is promoting were described at length in "Good Roads" for October 12. The progress which has been made by the association in the matter of the highway and along the line of bettering the roads throughout the Dominion was reported, and a number of papers were read and discussed.

Arrangements were made to send delegates to Ottawa to take up with the Dominion government the subject of giving more attention to the needs of the country in the matter of good roads.

A report from a representative of the association who recently made a trip in an automobile, on Canadian roads entirely, from the Atlantic Ocean to the Pacific Ocean, in 45 days, was received.

W. J. Kerr of New Westminster, B. C., was re-elected President; F. E. Mutton of Toronto was elected Vice President, and P. W. Luce of New Westminster was re-elected Secretary.

Plan New Boulevard for Kings Highway, Brooklyn

Chief Engineer Charles R. Ward of the Topographical Bureau of the Borough of Brooklyn, New York City, has prepared tentative plans for the widening of Kings Highway in that borough and is collaborating with Edw. H. Bennett of the Brooklyn Committee on City Plan, in the work of laying out the thoroughfare.

Kings Highway is considered a highly important link in the chain of Brooklyn highways and boulevards and to be an essential factor in the proper development of the borough. It extends from Bay Parkway to Eastern Parkway, and crosses and unites almost all the other boulevards and avenues which radiate out from Prospect Park and the territory lying beyond it to the Flatbush Avenue extension.

It is said to be probable that Mr. Ward and Mr. Bennett will agree on a boulevard from 180 to 200 ft. wide for a considerable portion of the road except in places where a width of 100 ft. has already been decided upon and a short business section where it will be 80 ft. wide. Mr.

Ward presented plans providing for a width of 180 ft. He is said to believe, however, that an extra 20 ft. would not add materially to the cost.

For that section between Flatbush Ave. and Ave. P he suggests a 100-ft. boulevard, as at present laid down, narrowing down to 80 ft. between Ave. P and Ocean Parkway. Between Flatbush Ave. and Eastern Parkway he suggests a width of 180 ft. This would permit a 30-ft. sidewalk on each side, 60 ft. of parking space in the center, and a 30-ft. roadway on either side of this.

An arrangement now being employed in laying out several Flatbush streets is suggested for the sidewalks. This is to have a 10-ft. walk running between rows of trees, planted in 10-ft. grass plots, the outside row being planted 10 ft. from the curb and the inner row 10 ft. from the building line. Where the street is only 100 ft. wide Mr. Ward suggests 20-ft. sidewalks with a row of trees in the center, 10 ft. back from the curb, two 25-ft. roadways and a 10-ft. plot in the center, between the roadways. Another row of trees could be planted in this center plot, according to his idea, or clusters of electric lights placed at intervals as on upper 7th Ave., Manhattan.

At important intersections with other avenues, such as at Rockaway Parkway and Remsen Ave., he suggests ovals or plazas similar to Prospect Park plaza. On account of the number of streets coming to a junction at these points he thinks that this would be not only an attractive but an economical and convenient plan.

Tri-State Convention at Mammoth Cave, Kentucky

A convention attended by about 250 delegates from the states of Indiana, Kentucky and Tennessee and several hundred local visitors was held on the lawn of the Mammoth Cave Hotel at Mammoth Cave, Ky., on October 5. Most of these delegates motored from various points in the three states, and reported a variety of road conditions on their several routes.

Among the speakers who addressed the delegates were: R. C. Terrell, representing Gov. James B. McCreary of Kentucky; Capt. James W. Fortune, Jeffersonville, Ind., representing Gov. Thomas Marshall of Indiana; Leland Hume of Nashville, representing Gov. B. W. Hooper of Tennessee; W. O. Head, Mayor of Louisville; Hon. Chas. Bookwalter, Indianapolis; Chas. C. Gilbert of Nashville; Harry A. Sommers, Elizabethtown; J. A. McDaniels, Horse Cave; J. L. Bosworth, Middleboro, Ky.; Chas. H. Buntin, Portland, Tenn.; J. M. Lewis, Glasgow; McKenzie Moss, Bowling Green, and J. McBryde, Louisville. After the speaking in the morning the delegates enjoyed a barbecue.

The most important event of the convention was the formation of the Lakes to the Gulf Highway Association, the object of which is to encourage and assist in the building of a continuous highway through the states of Kentucky, Indiana and Tennessee and the states contiguous thereto, and to encourage the construction of lateral highways intersecting this main road. Pendleton Beckley of Louisville was elected President, and H. L. Ramsey, also of Louisville, secretary. Annual meetings will be held by the association and the directors will hold quarterly meetings. It is stated that the organization proposes to publish a magazine in the interest of good roads, and it is also expected that local clubs, subsidiary to the organization, will be organized in the several counties of Indiana, Kentucky and Tennessee.

The municipality of St. Boniface, Manitoba, will vote Nov. 6, on a by-law for the building of a \$500,000 bridge across the Red River in that municipality to replace the Provencher Ave. bridge.

Coming Meetings

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

The County Road system has been adopted by popular vote in Shiawassee County, Michigan.

Street paving amounting to 4.96 miles has recently been completed in Key West, Fla., the entire cost of the work being \$224,458.16.

Jones County, Miss., contemplates calling an election for the purpose of voting on a \$200,000 highway bond issue.

The taxpayers of Precinct No. 4, Medina Co., Tex., have voted favorably on the proposition of issuing \$40,000 in good roads bonds.

Five miles of concrete sidewalks have been laid in the city of Terrell, Tex., during the current year, and two additional miles are now under construction.

The War Department has sanctioned the building of a steel bridge across Suisan Bay above Martinez, Cal. The estimated cost is \$1,650,000.

The Port Colborne, Ont., Highway Department is considering the feasibility of building a road from that town to Port Erie, Ont., and the erection of road signs for the benefit of motorists.

The new law by which Iredell Co., N. C., established a system of working all roads of the county by taxation, went into effect September 1. This law was ratified by the voters at the same time that \$400,000 in bonds were voted for road improvement.

The taxpayers of Precinct No. 1, Fort Bend County, Tex., will hold an election on November 5 for the purpose of voting on the issuance of \$350,000 of road bonds. If the issue carries, the money will be used to construct shell and gravel roads in the precinct.

The last of the four installments of the issue of road bonds in Duval Co., Fla., has been sold to E. H. Rollins & Co. of Boston at a premium of \$16,432.50. This firm was the highest of seven bidders.

A resolution was adopted at the recent convention of the National Rural Letter Carriers' Association at Nashville, Tenn., suggesting that the members in the different states appoint committees to wait upon their respective legislators with a view to securing legislation tending towards the improvement of roads.

Sidewalks will be built in Elgin, Ill., the coming year under the special assessment plan by which the Board of Local Improvements will arrange the walks they desire laid into groups, levy the cost against the property benefited and advertise for bids. Commissioner John S. Russell of Elgin states that the plan is to spread the payment over three annual installments.

Allotments of space for the Annual Automobile Show to be held this year in the Grand Central Palace and Madison Square Garden, New York City, were made at the headquarters of the Automobile Board of Trade in that city, October 3. There were 87 applications for space from automobile manufacturers and 403 applications from accessory manufacturers.

Recommendations that a progressive policy for the removal of all grade crossings in the District of Columbia be followed, together with a specific recommendation that the grade crossing on Benning Road, where it intersects the track of the Baltimore & Ohio R. R., has been submitted to the district commissioners in the annual report of C. B. Hunt, District Engineer of Highways.

In an opinion recently given to State Highway Commissioner Bigelow of Pennsylvania by Attorney General Bell, a commissioner can require railway companies occupying sections of state highway routes to pave between their tracks and for a limited space on the outside thereof with the same materials as used in road improvement on the road over which the trolley passes or any material which the commissioner may select.

The Manhattan, Kan., Motor Club has established a plan for bettering the condition of the country roads within

a radius of ten miles of Manhattan, which has proven effective. The club gives a road drag to every farmer who will guarantee to use it to keep three miles of road in good condition. The club has given away about fifty drags, and is receiving requests for them at the rate of about four a week. The drags cost the club about \$6 each.

Personal Notes

James H. Stone, City Engineer of Franklin, N. H., has resigned.

C. L. Strange, Mobile, Ala., County Engineer in charge of road construction in Mobile Co., has resigned.

Theodore Tobish has been appointed County Engineer of Mercer County, N. J., succeeding Frank J. Eppele, who has resigned.

A. L. Gilmore, a civil and landscape engineer of Binghamton, N. Y., has been appointed resident engineer for the Binghamton Paving Brick Co. of that city.

Captain Julian L. Schley, Corps of Engineers, U. S. A., has been appointed Assistant Engineer Commissioner of the District of Columbia, succeeding Maj. E. M. Markham.

Maj. W. W. Crosby, Consulting Engineer of the State Roads Commission of Maryland, has moved his private offices to 1431 Munsey Bldg., on the southeast corner of Fayette and Calvert Streets, Baltimore, Md.

Trade Notes

John R. Thompson has been appointed County Road Engineer of McCracken County, Ky., at a salary of \$1,500.

S. H. Kimball of Henderson, Ky., has been appointed County Road Engineer of Henderson Co. at a salary of \$2,200 a year.

The National Safety Wood Paving Co., formerly of 88 Broad St., Boston, Mass., has removed to 1520 Real Estate Building, Philadelphia, Pa.

The Matchless Street Cleaner Co. has been incorporated at Green Island, N. Y., with Albert E. Davis as president and C. H. Peddrick as secretary and treasurer. Mr. Peddrick has recently invented a new horse-drawn pick-up street cleaning machine known as the "Matchless" street cleaner.

CONTRACT NEWS

ROADS AND STREETS.

Contracts Pending

Date of letting.	Reported in issue of
10-21 Birmingham, Ala., road imp.	10-19
10-21 Montgomery, Ala., grad., drain, gravel road.	10-12
10-21 Sacramento, Cal., state highway work.	10-12
10-21 Chicago, Ill., grad., curb, and paving.	10-19
10-22 Linden, Ala., grad., sand clay surfacing.	10-12
10-22 Tuscaloosa, Ala., street work.	10-19
10-23 Chicago, Ill., street imp.	10-19
10-23 New York, N. Y., street work.	10-19
10-24 Birmingham, Ala., road imp.	10-19
10-24 New York, N. Y., street imp.	10-19
10-25 Cincinnati, O., road repairs.	10-12
10-29 Corona, Cal., road constr.	10-19
11-1 Columbus, O., state highway work.	10-19
Bridges.	
10-21 South Bend, Ind., flat top I beam bridge.	10-19
10-22 Shreveport, La., bridge.	10-12
10-23 Cleveland, O., steel bridge.	10-12
10-23 Ft. Worth, Tex., 2 reinforced con. viaducts.	10-5
10-24 Upper Sandusky, O., 2 steel superstructures.	10-12
10-24 Butler, Ga., reinforced con. bridge.	10-12
10-25 Cincinnati, O., bridge.	10-12
10-25 Columbus, O., culvert and approaches.	10-12
10-30 Cleveland, O., piers.	10-12
11-1 Cincinnati, O., extension of bridge.	10-19
11-2 Cleveland, O., bridge constr.	10-19
11-6 Eutaw, Ala., erecting 6 steel bridges.	10-19
11-11 Huntsville, Tex., 2 steel bridges.	9-21
Miscellaneous.	
10-26 Dayton, O., bridge bonds.	9-28
10-29 Corsicana, Tex., st. pav. bonds.	10-19
10-29 Devine, Tex., good road bonds.	10-19
11-7 Hallettsville, Tex., good road bonds.	10-19
12-7 Pearsall, Tex., good rd. bonds.	10-19

ROADS AND STREETS.

Bids Asked and Prospective Work.

Birmingham, Ala.—Bids will be received by the Bd. of Co. Comrs. of Perry Co. at the Court House, Marion, until 2 p. m., Oct. 21, for grading, draining and surfacing with sand clay about four miles of the Fikes Ferry Road at an expenditure of \$5,000. Bids will also be received for the improvement of five miles of the Marion-end of the Uniontown Road. Plans and specifications are on file at the office of Geo. C. Scales, Co. Highway Engr. at Marion.

Sealed bids will be received by the Bd. Co. Comrs. of Jefferson Co. until Oct. 24 for grading, draining and surfacing with chert approximately three miles of the old Stouts Road at an expenditure of \$8,000. W. S. Keller is State Highway Engr.

Tuscaloosa, Ala.—Sealed proposals will be received by the Bd. of Comrs. of Tuscaloosa, until 10 a. m., Oct. 22, for the following street work: Constructing 1,200 lin. ft. concrete curb with steel corner bar; 10,480 lin. ft. of plain concrete curb; 2,760 lin. ft. of granite curb, 6 by 18 in.; 14,690 lin. ft. of 24-in. concrete gutter; 62,800 sq. yds. of creosoted wood block, brick, sheet asphalt, asphaltic concrete, granitoid or bitulithic pavement. Plans and specifications may be obtained by application to W. H. Nicol, City Engr.

Phoenix, Ariz.—The City Council has taken preliminary steps for the paving of Central Ave. from Adams to Washington Sts.

Bakersfield, Cal.—H. H. Jastro, Road Cmr. of this District, plans to construct macadam paving from the city limits to Chester Ave. with concrete posts on either side.

Corona, Cal.—Bids will be received up to October 29 by the Bd. of Trustees for the construction of three miles of cement curbs and gutters on Grand Blvd. The work will cost about \$80,000. M. Terpenning is City Clerk.

The Trustees have ordered the improvement of Grand Boulevard between the city limits, a distance of 15,000 ft. in length. The work will include grading, oil macadam paving, cement curbs, gutters, etc. The estimated cost is \$80,000. C. Guiley is City Engr.

Los Angeles, Cal.—D. D. Chapman was awarded the contract for improving portions of Mitchell Pl., at \$2.15 per lin. ft.

for grading and graveling complete; 5c. per sq. ft. for regrading, gravel and oil; 35c. per lin. ft. for cement gutter; 35c. per sq. ft. for vitrified block gutter; 11c. per sq. ft. for sidewalk; \$350 for storm drains and appurtenances complete; total, \$5,355.20.

Orange, Cal.—The City Trustees have authorized the paving with asphalt of 7 blocks on Chapman Ave.

San Diego, Cal.—A petition signed by a long list of property owners has been presented to the City Council for paving University Ave. from Park Blvd. to the city limits.

San Francisco, Cal.—The Bd. of Pub. Works has granted permission to property owners to perform street work, under private contracts, as follows: Grade Cabrillo St., between 22d and 23d Aves.; grade and sewer Oliver St., between Mission and Brunswick Sts.; grade and pave 23d Ave., between Geary and Anza Sts.; curb and pave in front of property of Southern Pacific Co. in Arlington St., between Charles and Miguel Sts.; curb and pave Moraga St., between 11th and 12th Aves.; curb and pave 14th Ave., between Irving and Judah Sts.; grade and pave Stevenson St., off 8th, leading to Emergency Hospital; curb and pave Naples St., between Brazil and Persia Aves.; also between Brazil and Excelsior Aves.; curb and pave Paris St., between Sickles Ave. and its southerly termination.

The Bd. of Pub. Works has asked for an appropriation of \$20,000 with which to pave Fulton St., between 5th and 13th Aves.

Bartow, Fla.—As a result of a conference between a comm. of City Council and citizens, it is probable that a small amount of experimental paving with vitrified brick, tar macadam and concrete will be done with the purpose of deciding what material to use in constructing paving for the city. Address Mayor Hatton.

Boise, Id.—The contract for constructing 47,875 lin. ft. of sidewalk and 53,800 lin. ft. of curb in the northwest part of the city has been awarded to the Idaho Hardware & Plumbing Co. of Boise at \$39,461.75.

Chicago, Ill.—Bids will be received Oct. 21 for improving several streets by grading, curbing and paving with brick on a cement foundation. Edward J. Glackin is Sec'y of the Bd. of Local Imps.

Bids will be received Oct. 23 by the Bd. of Loc. Imps. for improving certain streets by paving, with brick or wooden blocks, curbing, etc. Edward J. Glackin is Sec'y of the Bd.

Special assessments have been levied for the following street improvements: Improving portions of Montrose Ave. from the west line of Northwest Ave. to the northeasterly line of Elston Ave. by constructing new catch basins, curbing with sandstone curbstones and grading and paving with repressed vitrified paving brick; for improving the first alley east of South Park Ave. from the north line of E. 29th St. to a point 190.48 ft. north of the north line of E. 29th St. by constructing concrete curb, grading and paving; for improving the alleys between Oakwood Blvd. and E. 40th St., Langley Ave. and Cottage Grove Ave. by constructing concrete curb and grading and regrading with repressed vitrified brick; improving the alleys in the block bounded by E. 50th St., Hyde Park Blvd., Drexel Blvd. and Ellis Ave. by constructing concrete curb and grading and paving with repressed paving brick; Montrose Ave., between N. Clark St. and the west line of E. Ravenswood Park by constructing new catch basins, granite curbs and granite concrete combined curb and gutter, grading with repressed paving brick; improving St. Lawrence Ave., between E. 63d St. and E. 68th St. by constructing and connecting catch basin inlets, constructing granite and concrete combined curb and gutter; grading and paving with asphalt.

Indianapolis, Ind.—The Bd. of Pub. Works has adopted a resolution for paving South West St. from Washington St. to Kentucky Ave. The estimate of cost based on wood block is \$18,277.

Algonia, Ia.—Notice of intention to curb certain streets in the city of Algonia has been issued by the City Council, and notice of intention to pave certain streets and alleys has also been issued. The work includes grading, excavating, removing the earth to a subgrade and paving. There are nine different kinds of construction specified: first, a two-inch wearing surface of Sarcolithic mineral rubber pavement on a Portland concrete foundation;

a Portland concrete pavement consisting of six inches of one mix Portland concrete with granite or quartzite; a two-inch asphaltic concrete wearing surface on a Portland concrete foundation; one-half inch wearing surface of asphaltic concrete with a one and one-half-inch binder course, composed of stone and asphalt on a Portland concrete foundation; two-inch wearing surface of asphaltic concrete, the coarse aggregate of which shall not exceed one inch in size laid on a Portland concrete foundation; one course of No. 1 vitrified paving brick block with asphalt filler and sand cushion on a Portland concrete foundation; a two-inch wearing surface composed of bitumen and stone, constructed with the penetration or mixing method, laid on a four-inch base of crushed stone; a two-inch wearing surface composed of bitumen and stone constructed with the penetration or mixing method on a six-inch base of crushed stone. The contemplated work comprises 25,932 sq. yds. of paving and 14,317 lin. ft. of curbing. The work is now being staked out and it is the intention to get the preliminary grading done this Fall and let the contracts for the improvements about the first of the year. Theo. S. DeLay, Creston, Ia., is engineer in charge.

Two miles of asphalt pavement will be laid in Algonia in accordance with a resolution passed by the City Council.

Dubuque, Ia.—The City Council has passed a resolution of intention to pave Kaufman Ave., between Cushing Pl. and Hempstead St. with brick block on a macadam foundation. Engineer's estimate includes 2,548 sq. yds. of brick block pavement with asphalt filler, 1,000 lin. ft. of stone curbing reset, 160 lin. ft. of new stone curb.

Escanaba, Mich.—The voters of Delta Co. will be called upon to vote on a proposition of issuing \$100,000 in bonds for repairing, extending and improving the county's system of highways at their regular election, November 5.

Petoskey, Mich.—The annual budget made up by the City Council provides for the paving of 23 blocks of the city streets next spring. The estimated cost of the work is stated to be \$40,350.

Columbus, Mo.—The city is planning to put in about 1½ miles of concrete paving, including Sexton Road.

Beatrice, Neb.—Several blocks of pavement will be laid. J. W. Mayer is Mayor.

New York, N. Y.—Sealed bids or estimates will be received by the Park Bd., at the office of the Dept. of Parks, Arsenal Bldg., 5th Ave. and 64th St., Borough of Manhattan, City of New York, until 3 p. m., Oct. 24, 1912, for furnishing and setting and resetting curbstones and paving with asphaltic concrete upon a concrete foundation the roadway of the plaza at 110th St. and 8th Ave., Boro. of Manhattan, and for furnishing all the labor and material for repairing the asphaltic pavement on the roadway of the Bronx and Pelham Parkway, from Butler St. to the Bear Swamp Rd., in the Boro. of the Bronx.

Sealed bids or estimates will be received by the President of the Boro. of Brooklyn at his office in Boro. Hall until 11 o'clock a. m. on Oct. 23, 1912, for regulating, grading, curbing and laying sidewalks on Beverly Rd., from E. 2d St. to Gravesend Ave.; for regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of E. 21st St., from Newkirk Ave. to Foster Ave.; for regulating and paving with permanent asphalt pavement on a 6-in. concrete foundation the roadway of Ave. H, from Coney Island Ave. to the right of way of the Brighton Beach R. R.; for regulating, grading, curbing and laying sidewalks on Ave. I, from Coney Island Ave. to E. 15th St.; for regulating, grading, curbing and laying sidewalks on Jefferson St., from Irving Ave. to St. Nicholas Ave.; for regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of Lenox Rd., from E. 34th St. to New York Ave.; for regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of Moultrie St., from Norman Ave. to Meserole Ave.; for regulating and repaving with asphalt on a concrete foundation the roadway of Georgia Ave., from Atlantic Ave. to Liberty Ave.

Akron, O.—An ordinance has been passed determining to proceed with the improvement of Andrus St., between Miller and Cole Aves., by grading, curbing, paving and constructing sidewalks.

Alliance, O.—The following ordinances have been passed by the City Council: Levying a special tax to pay the cost of grading Cherry Ave., between State St. and Harris Pl.; levying a special tax to pay the cost of completing the improvement of E. State St., from Arch to Union Aves., by grading and paving with brick block; levying a special tax to pay the cost of grading, draining, setting curb and paving with brick Ridgewood Ave., from State St. to South Corporation line; levying a special tax to pay the cost of grading Mill St. between Cherry and Arch Aves.; levying a special tax to pay the cost of grading, setting curbs, and paving with brick to a width of 16 ft. North Walnut Ave., between the Mahoning River bridge and the North Corporation line; levying a special tax to pay the cost of grading, draining, setting curb and paving with brick South St., between Arch and Liberty Aves. A resolution has been passed authorizing the appointment of an equalization board on the Vine St. paving improvement.

Canton, O.—A resolution has been passed declaring it necessary to improve Marvin Ave. from Garner St. to Fulton St. by grading to the established grade, setting curbing, laying flagstone sidewalks, vitrified block crosswalks and gutter, paving and providing the necessary drainage.

Cincinnati, O.—Sealed proposals will be received at the office of the Bd. Co. Comrs. of Hamilton Co. until noon, Oct. 25, for repairing Springfield Pike between Glendale and Wyoming in Springfield Twp.

Sealed proposals will be received by the Bd. Co. Comrs. of Hamilton Co., until noon, Nov. 1, for the improvement of Plainfield Pike in Sycamore Twp. Plans and specifications on file in the office of the Bd. Co. Comrs. Stanley Struble is President of the Board.

The Co. Comrs. of Hamilton Co. have approved estimates for the improvement of Deerfield Rd. at a cost of \$9,686 and for repairing the Montgomery Pike in Silverton at a cost of \$3,130.

Cincinnati, O.—The following ordinances have been passed by the City Council: Determining to proceed with the improvement of E. 5th Ave., between Eggleston Ave. and Lock St.; providing for the issue of bonds in the sum of \$21,000 to pay the cost of improving certain streets and alleys; authorizing the change of the curbing along the line of the southeast corner of McMicken Ave. and Elm St.

Cleveland, O.—An ordinance has been passed authorizing the levying of a special tax to pay the cost of grading, draining, setting curbs and paving Beman Ave. S. E., from Warner Rd. S. E. to 1,490 feet westerly.

Columbus, O.—Sealed bids will be received at the office of the State Highway Comr. at Columbus, until 2 p. m., Nov. 1, 1912, for grading and paving with a water-bound macadam, the Bucyrus and Gallon Rd., Polk Twp., Crawford Co.; length, 6,050 ft.; width, 12 ft.; estimated cost of construction, \$4,815.50. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Nov. 1, 1912, for grading and paving with brick for medium traffic, the Woodfield Northern Rd. in Center Twp.; length, 4,516 ft.; width, 12 ft.; estimated cost of construction, \$14,911.45. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Dept.

Sealed proposals will be received at the office of the State Highway Comr., at Columbus, until 2 p. m., Nov. 1, 1912, for grading and paving with a bituminous macadam, the Marlon and Delaware Rd., in Pleasant Twp., Marion Co.; length, 8,430 ft.; width, 14 ft.; estimated cost of construction, \$9,118.28. Plans and specifications are on file in the office of the Co. Comrs. and the State Highway Dept. James R. Marker, Columbus, is State Highway Comr.

Ordinances have been passed by the City Council providing for the issuing of bonds in anticipation of the collection of special assessments for the improvement of the following streets: Alley north of 17th St. from Pearl St. to Waldeck Ave., \$3,000 in bonds; Tompkins St., from Indianapolis Ave. to Summit St., \$4,000 in bonds; 9th St., from 5th St. to Summit St., \$10,000 in bonds; Wesley Ave., between Chittenden and 11th Aves., \$3,000 in bonds; Waldeck Ave., between Woodruff and Northwood Aves., \$8,000 in bonds; Indianapolis Ave.,

from Chittenden Ave. to 14th St., \$6,000 in bonds; Burgess, between Broad St. and the South Terminus, \$22,000 in bonds; 18th Ave., between Summit and 4th Sts., \$8,000 in bonds; Terrace Ave., between Broad St. and the South Terminus, \$17,000 in bonds; 4th St., between Innis Ave. and Merritt St., \$8,000 in bonds; Schultz Ave., between Broad St. and the P. C. & St. L. Ry., \$11,000 in bonds; Alden Ave., between Summit and 4th Sts., \$6,000 in bonds. Address John T. Barr, Clerk of the Council.

Dayton, O.—The City Council has passed the following ordinances for street work: Determining to proceed with the improvement of Ernst Ave., from Main St. to Stillwater Ave.; authorizing the levying of special assessments for the improvement of Newport Ave., between Resor and Rost Aves.; determining to proceed with the improvement of First alley east of Main St., between Wyoming and Ashley Sts.; authorizing the levying of special assessments for the improvement of Wildwood Ave., between Bolender Ave. and South Terminus; authorizing the levying of special assessments for the improvement of McDonough St., between 3d and 5th Sts.; authorizing the levy of special assessments for the improvement of June St., between 5th and 2d Sts.; authorizing the levying of special assessments for the improvement of the alley north of Cottage Grove Ave. between the alley east of Salem Ave. and Bellevue Ave.; authorizing the levying of special assessments for the improvement of Hollencamp Ave., between Jefferson and Warren Sts.; authorizing the levying of special assessments for the improvement of Delaware Ave., between Wheatley Ave. and the east line of lots 33,288 and 33,269; authorizing the levying of special assessments for the improvement of Meigs St., between 2d St. and Monument Aves.

Toledo, O.—Resolutions have been passed by the City Council declaring it necessary to make the following improvements: Grading and paving Elmwood Ave., between Sylvan and Smead Aves., including alley intersections; grading and paving Woodland Ave., between Detroit and Brown Aves., including alley intersections; grading and repaving Summit St., between the Perry St. bridge and Cherry St., including alley intersections.

Youngstown, O.—The following ordinances have been passed by the City Council: Authorizing the levying of special assessments for the improvement of Portland Ave., between Mahoning Ave. City Lot No. 17,617, by paving; authorizing the levying of special assessments for the improvement of Salt Spring St. by paving; authorizing the levying of special assessments for the improvement of Oxford St., between Foster St. and Belmont Ave.; levying special assessments for the improvement of Chalmers between Hillman and Garlick Sts., by paving; levying special assessments for the improvement of Eagle St. between Rayne Ave. and Caldwell St., and between Eagle St. and Afele St., by paving.

Pittsburgh, Pa.—An ordinance has been passed authorizing the grading, paving and curbing of Elwood St., from Summersea St. to Maryland Ave. The Mayor and Director of the Department of Public Works have been directed to advertise for bids for the work. Estimated cost, \$4,600.

Brownsville, Tex.—The City Council has adopted an ordinance providing for the paving of 14 blocks of the city streets in the business district.

The City Council will soon let the contract for paving about a mile of street with creosoted wood blocks. The cost of the work will be approximately \$40,000.

Ft. Worth, Tex.—City Engr. Von Zuben has prepared estimates for paving certain portions of Clinton Ave.

Bellingham, Wash.—City Engr. W. H. North has submitted a preliminary report of the cost of improving Oak St., between Elk St. and the alley in block 55 of New Whatcom. His figures are \$1,246. This street is to be improved by grading and filling.

Wenatchee, Wash.—The City Council has decided to pave the principal business portion of the city at a cost of \$135,000.

Monroe, Wis.—The Council is planning to pave several streets with brick. Address Mayor.

Bids Received and Contracts Awarded.

Mobile, Ala.—The contract for the construction of 8 miles of county highway on the Moffatt Rd., has been awarded by the Bd. Co. Comrs. of Mobile Co. to the Jett Bros. Contr. Co., at \$27,546.69. The work includes the construction of concrete bridges.

Pine Bluff, Ark.—The contract for paving Main St. with asphaltic concrete on a five-inch base, and with bricks between the car tracks, has been awarded to Levy & Levy of Muskogee, Okla., at \$1.48 per sq. yd., aggregating about \$40,000, the contract including the widening of the street from six to ten feet between 7th and 10th Aves., and repairing curb and gutter.

Cucamonga, Cal.—J. D. Kerr of Upland was awarded the contract at \$4,500 for constructing a rock storm drain and culverts approximately 6,680 ft. in length on Hellman Ave. for the Cucamonga Storm Water Protection Dist.

Los Angeles, Cal.—The Fairchild-Gilmore-Wilton Co. was awarded the contract for improving Center St., between Aliso and First Sts., at 17c. for paving, 30c. for cement curb, 40c. for granite block gutter, \$2,530 for storm sewer system and appurtenances; total, \$15,618.52.

Los Gatos, Cal.—San Jose St., from the city limits on the northeast to Main St.; all of Main St.; Santa Cruz Ave. to a point 600 ft. south of Broadway to Saratoga Rd. and Saratoga Rd. to the city limits west, are to be paved. The work will be asphalt on a 4½-in. concrete base. Estimated cost about \$80,000.

San Bernardino, Cal.—The Highway Construction Co. of Redlands, was awarded the contract at \$13,962.93 for oiling and construction of gutters on B St. from 4th to Base Line. Other bidders were: Johnson & Shea, \$15,847.81; Ernest Frenzell, \$14,104.

Sherman, Cal.—John Radich, 610 W. 54th St., Los Angeles, was low bidder at 14c. sq. ft. for sidewalks and culverts and 42c. lin. ft. cement curbs, in Road Districts Nos. 11 and 12, at Sherman, Cal. The work is estimated to cost about \$25,000, and will be done under the road district improvement act. Other bids received by the supervisors were: C. G. Cummings, Redonda Beach, 14.4c. sq. ft. sidewalks and 42.7c. lin. ft. curbs; Geo. R. Curtis, 16c. sq. ft. for sidewalks, 45c. for curb; total, \$27,495.86. H. C. Hartley, Engineer, Sherman, Cal.

Petersburgh, Fla.—The City Council has awarded the contract for paving 55 blocks of city streets with vitrified brick to the Georgia Engineering Co., at \$1.54 per sq. yd.

Macon, Ga.—The contract for paving Forsythe St. with cement has been awarded to John H. Lowe Co., at \$1.34 per sq. yd.

Clinton, Ill.—The contract for the construction of concrete surface for the paving of 2d Ave., between 3d and 4th Sts., has been awarded to Thomas Carey & Son at \$1 per sq. yd.

Decatur, Ill.—The contract for paving No. Morgan St. from the Illinois Central right of way north to the city limits and from Oakland Ave. to the Wabash right of way have been awarded to S. A. Tuttle at \$8.292.

Galesburg, Ill.—The Bd. Local Imps. has awarded the contract for paving Ferris St. to J. E. McCauley at \$17,789.45. The only other bidder was J. A. Rutledge of Rockford, his estimate being \$18,092.55.

Mattoon, Ill.—The contract for paving 32d St. has been awarded to Thornton & Michaels at \$7,064.20. C. L. James is City Engr.

Rockford, Ill.—The Bd. of Loc. Imps. has awarded the contracts for paving the alley in the rear of the City Hall to A. E. Rutledge for \$1,048.75 and the macadamizing of Paris Ave. to Fred Carrico for \$5,188.60.

Springfield, Ill.—The contract for paving one and one-quarter miles of streets in Springfield has been awarded by the Phelps Grove Park Co. to J. S. Wood Constr. Co. at \$15,000.

Tuscola, Ill.—The P. J. Goggin Contracting Co., was given the contract at \$6,443.25 for the W. Main St. improvement. The other bids were \$6,475 by Breese & Brown of Mattoon, and \$7,000 by Monroe Farrar of Mattoon.

Elkhart, Ind.—The contract for the construction of sidewalks on Nobel St. has been awarded to F. W. Hillman at 7.94 cts. per sq. ft. The contract for the construction of sidewalks on Rice St. was awarded to F. W. Hillman at 8c. a sq. ft.

Indianapolis, Ind.—The contract for street grading in Mars Hill has been awarded to Costello Bros. at 21c. per cu. yd., amounting to \$36,855.

Hutchinson, Kan.—The contract for paving 4th Ave. with one course experimental brick under a one-year guarantee, has been awarded to Everitt & Burt, Hutchinson, at \$6,478, itemized as follows: Grading, 35c.; curbing and gutter, 73c.; gutter alone, 43c.; curb alone, 30c.; paving, \$1.09.

Baltimore, Md.—The State Roads Comm. has awarded contracts for state road work as follows: The road from Easton to Dover Bridge, Chesapeake Constr. Co., \$25,880.60; Snow Hill Rd., toward Pocomoke City, The Chesapeake Constr. Co., \$21,511.40; Belcamp Rd., Hartford Co., James C. Forsythe, \$14,819.05; Wesley Chapel Rd., Hartford Co., James C. Forsythe, \$11,585; Dover Bridge Rd., toward Preston, Chesapeake Constr. Co., \$30,026.24; approaches to Sharptown bridge, William H. Knowles, \$8,843.

The contract for vitrified brick paving in the Annex has been awarded by the Commission for Opening Streets to Patrick Flanagan & Son, at \$2.07 per sq. yd., aggregating \$19,300. The Elder Co. was the next lowest bidder at \$2.15 per sq. yd., aggregating \$20,155.

Cedar Rapids, Mich.—The City Council has awarded contracts for cement curbing and guttering on Bever Ave. between 19th and 21st Sts. and 17th St., between Bever and 5th Aves., to Percy F. Smith at \$2,273.

Grand Rapids, Mich.—The Bd. Pub. Wks. has awarded the contract for the laying of brick pavement on S. Market Ave. to Carpenter & Anderson at \$39,999.95.

Duluth, Minn.—The following bids have been received for paving E. 4th St., between 23d and 27th Aves.: P. McDonnell, asphalt, \$20,414.75; concrete with brick between tracks, and sandstone curb, \$22,030; concrete with concrete curb and brick between tracks \$20,317.50; all concrete pavement, \$18,479.70; General Contr. Co. of Minneapolis, \$22,200.50.

St. Paul, Minn.—The contract for the paving of 6th St. has been awarded as follows: Crushed stone, St. Paul Crushed Stone Co., at \$1.45 per cu. yd.; cement, The Capital City Lime & Cement Co., at \$1.47 a barrel; creosoted wood block, The Republic Creosoting Co., \$1.65 per sq. yd.

Meridian, Miss.—Contracts for street paving have been awarded as follows: Dolarway paving, Healy Constr. Co., \$1.14 per sq. yd.; gravel macadam, P. C. Powers & Son, \$1.05 per sq. yd.

Rochester, N. Y.—The Bd. Loc. Imps. has received the following low bids for street work: Constructing walks on Grace St., Passero & Petrossi Co., \$103.50; walks on Hart St., Passero & Petrossi Co., \$187.50; constructing asphalt pavement on Lozier Pl., Whitmore, Rauber & Vicinus, \$14,884.50; walks on Ravine Ave., John J. Regan, \$385.50; walks on Priscilla St., J. Petrossi Co., \$302.25; walks on Glenwood Ave., John J. Regan, \$343.50; walks and grading on Gale Terrace, M. Franciosa & Bro., \$3,886.50.

Syracuse, N. Y.—The low bid for laying sidewalks on both sides of Walton St. from South Clinton St. to Onondaga Creek was \$522, submitted by James G. Barr.

Caldwell, O.—The contract for paving a mile of the Sharon Rd. has been let to Danford, Glover & McElfresh of Caldwell, their bid being a little less than \$15,000.

Dayton, O.—The contract for paving Market St. between Main and Jefferson Sts. with Trimble block has been awarded to J. E. Conley & Co. at \$1,980. The contract for paving Bohlender Ave., between Cincinnati St. and Broadway with Trimble block has been awarded to J. E. Conley & Co. at \$17,767.50. The contract for paving Cincinnati St. from Bohlender St. to Miami Chapel Rd. with Harris block has been awarded to David Beard at \$9,029. The contract for paving Miami Chapel Rd. from Broadway to the Big Four Railroad with Harris block has been awarded to Cliff Houlihan at \$10,502. The contract for putting down sidewalks on Phillips Ave. has been awarded to Cliff Houlihan at \$192. The contract for graveling Marion St. has been awarded to Cliff Houlihan at \$478.

Perry, O.—The contract for paving the Painter Rd. with macadam has been awarded to Wm. McLane of Lisbon, O., at \$2,816. The distance is 2,900 feet, 25 feet wide. There was only one bid and the amount was within 50 cents of the engineer's estimate.

Springfield, O.—The following contracts have been awarded for street work: Paving McCreight Ave., between Limestone St. and the Odd Fellows' Home with Wessel block to J. H. McHugh at \$5,571.46; paving Columbia Ave. from Limestone St. to Lagonda Ave. with Harris brick to Ed. Ryan at \$22,190.10.

Youngstown, O.—A contract for street paving has been awarded to Turner & Olson at \$11,660.05.

Pittsburgh, Pa.—The Co. Comrs. of Allegheny Co. have awarded the contract for the improvement of two roads as follows: Constructing the Glassport and Elizabeth

extension road, a distance of one-half a mile, John Connelly, \$20,203.60; constructing one-half mile of the Chartiers Rd., A. Ancomi, \$14,101.50.

Washington, Pa.—The Co. Comrs. of Washington Co. have awarded the contract for improving Pigeon Creek Rd. to C. M. Driver of Pittsburgh at \$5,361. The contract calls for 1,200 ft. of improvement. The contract for the brick for paving the Carroll Twp. Rd. has been awarded to the United Firebrick Co. at about 71 cents per sq. yd.

Austin, Tex.—The City Cmn. has awarded the contract for laying about 40,000 sq. yds. of bitulithic street paving to the Texas Bitulithic Co. of Dallas, the price being \$2.09 for a 5-in. concrete base and \$2.03 for a 4-in. concrete base. The total amount involved in the contract is about \$90,000.

Salt Lake City, Utah.—The contract for paving 2d South St. between 10th East and 12th East Sts. with Utah rock asphalt has been awarded to G. A. Heman of St. Louis at \$21,504.27. The bid per sq. yd. was \$1.77.

Norfolk, Va.—The contract for paving Church St. with granite block, total area, 13,000 sq. yds., has been awarded to Edward Alcott at \$1.40 per sq. yd.

Bellingham, Wash.—The Dept. of Pub. Wks. has recommended that the contract for the improvement of Commercial St., between Holley and Chestnut Sts., be awarded to J. H. Lich on bids of \$7,329.27 and \$10,098.40 for asphalt and brick, respectively.

Colfax, Wash.—The City Council has awarded the contract to the Warren Constr. Co. for the paving of a new district comprising several blocks on Cooper and Thorn Sts., with Warrenite at \$7,116.

Warwood, W. Va.—The Warwood City Council has recommended to the County Commissioners of Ohio Co. that the bid of \$3,233.60 for curbing Main St. between 22d and 23d Sts., submitted by N. O. Holderman, Wheeling, be accepted. The contract for paving the thoroughfare includes a concrete base of four inches.

Wheeling, W. Va.—The Bd. of Control has awarded the contract for repairing the National Road over Wheeling Hill to Pickett & Shanefelt of Bellaire at \$9.20 per cu. yd. The work includes the repairing of landslides which occurred last winter.

BRIDGES.

Bids Asked and Prospective Work.

Eutaw, Ala.—Bids will be received by the Court of County Commissioners of Greene Co., at Eutaw, until 11 a. m., Nov. 6, for furnishing and erecting six steel bridges. W. S. Keller is State Highway Engineer.

Denver, Colo.—The Bd. of Pub. Works is considering plans for a viaduct to reach the stock yards district. Estimated cost, \$300,000 to \$400,000. Address Clerk of Bd.

Danbury, Conn.—The N. Y., N. H. & H. Ry. and the city will bear the expense of building a \$30,000 bridge across the White River. Address Mayor N. Burton.

Hartford, Conn.—The Public Utilities Commission has ordered the reconstruction of the bridge carrying White St., Danbury, over the tracks of the N. Y., N. H. & H. R. R., according to plans prepared by the railroad company. The bridge will be 33 ft. long between abutments, 50 ft. wide, of steel girder structure on concrete abutments. The railroad will pay 11-24 of the cost the city of Danbury 8-24 and the Danbury & Bethel St. Ry. Co., 5-24.

Tampa, Fla.—The City Council has adopted a resolution instructing the Bd. Pub. Wks. to construct a bridge over the Hillsboro River at Jackson St. on the east and Eagle St. on the west, to be erected at a cost not to exceed \$8,000, with the provision that the bridge be of sufficient proportions to have vehicle traffic if feasible.

Lewiston, Id.—The voters of this city voted to construct a modern steel bridge across the Clearwater near here, at a cost of \$35,000.

Indianapolis, Ind.—Plans for the erection of a concrete arch bridge 145 ft. long across Crooked Creek, north of Riverside Park, were submitted to the Bd. of Park Comrs. The bridge is to cost \$20,000. J. H. Lowry, Sec'y.

South Bend, Ind.—Sealed bids will be received by the Bd. Comrs. of St. Joseph Co., until 11 a. m., Oct. 21, for the construction of one flat top I-beam bridge on S. Carroll St. over Bowman Creek. Plans and specifications are on file in the office of Clarence Sedgwick, County Auditor.

Baltimore, Md.—Engineer Walter Whitman is preparing plans for the first of the four bridges to be built by the Water Department across the Gunpowder River.

West Point, Ind.—A new cement bridge will be built in a short time near the John Boulds farm, southwest of town. Albert Laxton will look after the work.

Hutchinson, Kans.—Reno Co. is preparing to build two concrete bridges across the Arkansas River. Address Co. Surv.

The Co. Comrs. of Reno Co. are planning to build a \$25,000 bridge at Main St. Address Co. Engr.

Baltimore, Md.—Plans for a long \$100,000 viaduct connecting the new Druid Ave. with the proposed Girard Ave. and providing a direct outlet from the Woodbury section of the city were prepared by City Engr. McCay.

Detroit, Mich.—Perfectured plans for three bridges to be built by the Cadillac Motor Car Co. over Cass Ave. to take the place of closing the street, were laid before the Street Openings Comm. of the Council by officers of the company. The plans show that the bridges will be ornamental and leave 15 ft. between pavement and bridge. Address Chmn. Vernon.

Cincinnati, O.—Sealed proposals will be received by the Bd. Co. Comrs. of Hamilton Co. until noon, Nov. 1, for the extension of a bridge over Duck Creek on Ridgewood Ave., Columbia Twp. Stanley Struble is president of the Bd.

The Co. Comrs. of Hamilton Co. have approved the plans and specifications submitted by Surveyor Cowen for a new concrete bridge to be constructed across Mill Creek on the Clark Rd. at an estimated cost of \$10,279.

Cleveland, O.—Bids will be received Nov. 2 for the construction of bridge work per report No. 3017, in accordance with plans, specifications and form of contract to be furnished by Frank R. Lander, Co. Surv. Address John F. Goldenbogen, Co. Clerk.

Hamilton, O.—The Co. Comrs. of Butler Co. have approved plans submitted by County Engr. Dillon for the construction of a concrete steel arch bridge at the Harvey Minton Farms in Hanover Twp., at \$3,583.84. Bids will be called in about a month.

Lisbon, O.—The Co. Comrs. of Columbiana Co. made arrangements to borrow immediately on short term notes the sum of \$65,000 for the rebuilding of bridges washed out by the storm of September 1. Co. Engr. French made a report of the bridges washed out and informed the board that \$35 would have to be replaced and repaired.

Altus, Okla.—The construction of a \$7,000 bridge across the north fork of the Red River between Snyder and Hendrick has been decided upon at a joint meeting of the Jackson and Kiowa County Commissioners.

Philadelphia, Pa.—Plans have been completed for an artistic concrete arch bridge to span Spring Garden St. on the line of the Reading Elevated bridge now in place. The bridge will have three arches each with a span of 35 ft. and a height of 16 ft. Address Clerk of the Bd.

Houston, Tex.—Work on the plans for the several bridges to be built in the city is being rushed that they may be submitted to the City Council within the next few weeks for approval on the proposition to advertise for bids after the bond issue is sold.

San Antonio, Tex.—The City and the Street Railway Co. are planning to build a \$12,000 concrete bridge across the river on South Alamo River. Address Aaron Pancoast, City Engr.

Wassau, Wis.—It has been definitely decided to at once rebuild the bridge over the Eau Claire River at Schofield to replace the one washed away by the flood of July 22. Estimated costs of the new bridge, which will have a 20-foot roadway, is \$8,000.

Bids Received and Contracts Awarded.

Colusa, Cal.—The Supvs. have awarded the contract for the construction of a bridge over Salt Creek, near Williams, to Schaad & Anthony, of Williams, for \$2,260.

Marysville, Cal.—The Co. Bd. of Svcs. have awarded the contract to Thomas & Post of Los Angeles for the erection of Parks Bar Bridge at \$36,000. The construction will be of concrete.

Santa Barbara, Cal.—The Russell-Green-Foel Co., Higgins Bld., Los Angeles, was awarded the contract at \$15,890 for the construction of the reinforced

concrete bridge across Mission Creek at State St. Other bids received were Munoz & Munoz, Los Angeles, \$16,233; John Williamson, Santa Barbara, \$17,918.37; Gauley & Clark, Los Angeles, \$18,350.

Santa Ana, Cal.—The Young Constr. Co., Hibernian Bldg., Los Angeles, was awarded the contract for the construction of the W. 5th St. bridge across the Santa Ana River on basis of cost plus 15 per cent.

Ventura, Cal.—A. C. Mayer, of Venice, was awarded the contract at \$18,000 for the construction of a reinforced concrete box culvert near Somis.

Lewiston, Id.—The following bids have been received for the construction of the proposed steel traffic bridge across the Clearwater River: Coast Survey Co., Portland, Ore., \$70,000; and \$82,000; Continental Bridge Co., Chicago, span, \$52,000; lift, \$49,800; Missouri Valley Bridge & Iron Co., Leavenworth, Kan., \$49,985; Milwaukee Bridge Co., Milwaukee, Wis., with no fills or approaches, \$55,800; Atlas Bridge Co., Portland, Ore., \$58,000; Colorado Bridge & Constr. Co., Denver, Colo., \$62,300; Security Bridge Co., Minneapolis, Minn., \$39,750, \$44,250, \$47,000, \$48,000, \$41,500, \$46,000, \$45,700, \$50,200 and \$34,800, according to plan; Central States Bridge Co., Indianapolis, \$59,900; Illinois Steel Bridge Co., Jacksonville, Ill., \$53,800; Model Steel Structural Co., Waukesha, Wis., \$38,423, no earth structure or excavating; O. H. Stratton, Spokane, Wash., \$55,000; International Contract So., Seattle, Wash., \$56,300. City Engineer D. C. Wright has the bonds under consideration.

St. Maries, Id.—The contract for the construction of a new steel bridge across the St. Joe River at St. Maries has been awarded to Corseallen Bros. of Coeur d'Alene at \$18,000.

Champaign, Ill.—The Bridge Comm. of the Bd. Spvrs. of Champaign Co. has awarded the contract for the construction of a 60-ft. bridge between East Bend and Condit Twp. to the Decatur Bridge Co. of Decatur at \$2,290.

Elkton, Md.—The Cmrs. of Cecil Co. have awarded the contract for a new iron bridge over Plum Creek, Elkton, to J. S. McIlvaine & Co., of Chambersburg, Pa., for \$2,823.

Brainerd, Minn.—The contract has been awarded for the construction of a combination steel piling bridge with tubular piers across Crow Wing River, between Sections 32 and 33, Twp. 133, range 29, the cost to be borne by Cass, Morrison and Crow Wing Counties to the Great Northern Bridge Co., of Minneapolis, at \$3,890.

Woodbury, N. J.—The Gloucester Co. Freeholders awarded the contract to erect a steel bridge over Mantua creek at Paulsboro, also a temporary structure to the Owego Bridge Co. for \$24,850.

Hamilton, O.—The contract for the construction of a truss girder bridge at the Michaels Farm in Union Twp. has been awarded by the Co. Comrs. of Butler Co. to O. V. Delaney at \$847.

Minneapolis, Minn.—The Comrs. Ct. of Wood Co. has let the contract to Hess & Skinner of Dallas for the construction of 21 steel bridges at an aggregate cost of \$28,000 at different points in the county.

Brigham City, Utah.—The Co. Cmrs. awarded the contracts for the construction of twelve bridges to the Omaha Structural Steel Works of Omaha, through A. A. Clark Co., of Salt Lake, local representatives. The contract price is \$29,000.

Wellsburg, W. Va.—The following contracts have been awarded by the County Court of Brooke Co. for the construction of bridges: A concrete bridge at Ryland Mill, Luten Bridge Co., of York, Pa., at about \$3,000; a steel bridge over Pot Run, York Bridge Co., at about \$2,500; a steel bridge over Fowler Mill Crossing, Penn Bridge Co., at about \$2,500.

BONDS.

Shelbyville, Ill.—Bonds have been voted for paving purposes. Address City Clerk.

Natchez, Miss.—The \$150,000 50-year, 5 per cent. good roads bond issue, recently authorized in Adams Co. has been sold to Well, Roth & Co. at a premium of \$4,535. They are to be delivered December 2.

Columbia, O.—The new First National Bank has been awarded an issue of \$20,000 Fulton Co. road bonds. A premium of \$260 was paid for the lot.

Dayton, O.—The Co. Cmrs. of Montgomery Co. have voted an issue of \$15,000 in emergency bridge bonds in order to take care of the repairing of the bridges recently damaged. Bids for the sale of these bonds will be received up to Oct. 26.

Port Erie, O.—A \$10,000 issue of Erie Twp. five per cent. road bonds has been sold to Hayden Miller & Co. of Cleveland at a premium of \$960.

Toledo, O.—The question of authorizing an issue of \$75,000 in bonds for parks and boulevards will be submitted to the voters at the November election.

Conemaugh, Pa.—The question of issuing \$13,500 in bonds for paving purposes will be submitted to a vote of the people. Address City Clerk.

Pittston, Pa.—Exter Borough will vote on the question of issuing \$80,000, 5 per cent. 30 years paying bonds. Address Borough Clerk at Pittston.

Wilmerding, Pa.—Twenty-five thousand in bonds has been voted for improving streets. Address City Clerk.

Richmond, Tex.—Eight thousand in bonds has been voted for bridge purposes. Address City Clerk.

Corsicana, Tex.—An election of taxpayers will be held on Oct. 29 to vote on the proposition of issuing \$20,000 of bonds for street paving.

Devine, Tex.—The taxpayers of Precinct No. 4, Medina Co. have voted favorably on the proposition of issuing \$40,000 of good roads bonds.

El Paso, Tex.—An election will be held Oct. 29 to vote on the question of issuing \$50,000 street grade bonds. Interest 5 per cent. Payable in 20 to 40 years. Address C. E. Kelly, Mayor.

Fort Worth, Tex.—The City Cmns. adopted an order for the paving of Peach St. Estimated cost, \$113,244.85. Address City Engr.

Hallettsville, Tex.—The Cmrs. Court of Lavaca Co. has ordered an election of taxpayers of Precinct No. 7 to vote on the proposition of issuing \$100,000 of good roads bonds.

Laredo, Tex.—It is stated that an election for the purpose of voting on bonds to the amount of \$150,000 for good roads purposes is contemplated in Webb Co.

Mexia, Tex.—The Attorney-General has approved the issue of \$150,000 good road bonds for good roads Dist. No. 4. Address City Clerk.

Orange, Tex.—The Council will issue \$20,000 additional paving bonds. Address Mayor.

Pearsall, Tex.—An election of taxpayers will be held in Frio Co. Dec. 7 to vote on the proposition of issuing \$80,000 of good roads bonds.

Quitman, Tex.—The Wood Co. Cmrs. have authorized an issue of \$120,000 road and bridge bonds. Address Co. Judge.

Richmond, Tex.—Eight thousand dollars in bonds have been issued for the improvement of city streets and sidewalks. Address City Clerk.

Sherman, Tex.—The recent issue of \$198,000 permanent improvement bonds, a suitable amount of which will be used for street paving, has been sold to Harris Trust Savings Co. at \$1,319 premium and the accrued interest.

Tivoli, Tex.—Twenty-five thousand dollars in bonds have been voted for good roads. Address City Clerk.

Woodshoro, Tex.—The taxpayers of Precinct No. 1 of Refugio Co. have voted favorably on the proposition of issuing \$45,000 bonds for road improvements.

South Bend, Wash.—An election will be held to decide the question of issuing \$200,000 in bonds for the construction of highways. Address Co. Engr.

MISCELLANEOUS.

Pueblo, Colo.—The City Cmrs. are negotiating with the railroads concerning the doing away with grade crossings. Address City Engr.

Negaunee, Mich.—The city of Negaunee will purchase a new rock crusher during the coming winter. Address City Clerk.

Pittsburgh, Pa.—The Co. Comrs. of Allegheny Co. have awarded the contract for the delivery of 750 tons of asphaltic concrete for the Center and Extension roads to Warren Bros. Co. at \$8.75 a ton.

Madison, Wis.—Nearly \$42,000 has been voted by towns in Dane Co. for road building, according to petitions filed by the proper town officers in the office of the County Clerk. A number of towns also have decided to construct new bridges, the total cost for those improvements aggregating \$5,450.

Milwaukee, Wis.—The Bd. Pub. Wks. has received the following bids for the purchase of a jaw rock crusher: J. I. Case Threshing Machine Co., Racine, Wis., \$1,150; Austin Western Co., Chicago, Ill.,

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Number
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Illinois Highway Bridges

The Illinois State Highway Commission has issued as bulletin No. 9, a 56-page pamphlet, 6 by 9 ins. in size, entitled, "Modern Bridges for Illinois Highways."

The purpose of the bulletin, as set forth in the introduction, is to encourage the construction of better highway bridges. Better bridges are needed for the traffic of today, it is stated, and good bridges are an essential factor towards future road improvement. The bulletin, it is further stated, shows by illustrations the difference between poorly and well constructed bridges, the text having been purposely reduced to a minimum and a relatively large number of illustrations used. These, it is believed, will show clearly the difference between old and modern types of bridges.

The illustrations occupy 41 pages of the bulletin and are accompanied, in most cases, by titles and sub-titles containing much explanatory matter. They show existing bridges of poor design and of correct design and include structures of long and short spans, concrete bridges, steel bridges with both wood and concrete floors, and wooden bridges. Many of the structures shown were built from plans drawn by the State Highway Department. Several of the illustrations show old bridges and the structures which have replaced them. Some of the views show a test bridge built by the Department, and illustrate the tests to which it was subjected.

This test bridge is a reinforced concrete arch having a clear span of 40 ft., and was built at the Southern Illinois Penitentiary by convict labor and subjected to a number of very severe tests. Heavy loads were placed upon it, each heavier than would be likely to be brought on a bridge or a public highway. In one of these a layer of crushed stone, 12 ins. deep, was spread over the bridge and on top of this cut stone was piled to a depth of 3 ft., making a total unit load of about 300 lbs. per sq. ft., or a total load of 106 tons. Under this the total sag due to the bend in the floor, as well as that in the girders, was $\frac{1}{8}$ in. This load was allowed to remain on the bridge for about three weeks, during which there was no increase in the deflection. The original deflection disappeared when the load was removed.

Another test described in the bulletin was made about a year later, when a railroad track was laid on the bridge and a very heavily loaded freight car was run upon it. As the car was somewhat longer than the bridge it was evident that when one truck was placed the center of the span would produce the maximum bend or sag in the structure. The weight on one truck was found to be 44 tons, and the rails were so cut that they would give no support to the load beyond the length of track occupied by the truck, which was about 8 ft. Thus the total load of 44 tons was applied over an area approximately 5 ft. by 8 ft. Under this load the total deflection, including the sag in the floor as well as that in the girder, was found by careful measurement to be 0.09 in. This deflection disappeared when the load was removed, and six or eight applications of the same load produced the same effect.

During the summer of 1911 another series of tests, more complete than the preceding ones was undertaken, according to the bulletin. Nine brick piers were built beneath the bridge for the purpose of measuring the deflections and the steel reinforcements in the girders and floor was exposed in 15 places to permit determinations of the deformations by means of gauge marks placed on the steel, and bolts were set in the upper part of the concrete girders to determine the deformation in the concrete. A load consisting of 420 tons of crushed stone was placed in eight large bins, and, in addition, 100 tons of pig iron were placed on the west girder and about 60 tons on the east girder. This load produced a total deflection of 1 in. in the west girder and $\frac{3}{4}$ in. in the east girder without causing failure of the structure. The pig iron was removed within a few days, but the load of 420 tons of stone remained on the bridge for a year, until the present summer. It was then taken off, the deflections being noted as it was removed. When the structure had been completely unloaded it was found to have recovered its original position.

The remainder of the text of the bulletin consists of a general discussion of the economy of well designed bridges of modern types; a detailed presentation of the subject of creosoted timber for bridge floors, and an explanation of the Highway Commission's part in the construction of bridges.

Street Work in Newport, R. I., in 1911

According to the annual report of J. K. Sullivan, Street Commissioner of Newport, R. I., for the year ending December 31, 1911, the mileage of streets, up to the date of the report, was 91.18 miles, divided as follows: Granite block pavement, 1.69; bitulithic and granite block pavement, 1.56; telford macadam, 15.55; macadam, 40.85; Tarvia macadam, 2.24; Tarvia, 1.73; cobble, 0.51; dirt, 27.05.

The sidewalks, on the same date, had a total length of 114.550 miles, the lengths of various kinds being as follows: Granolithic, 18.317; granolithic and dirt, 0.748; flagstone, 2.598; flagstone and cobble, 0.145; flagstone and dirt, 1.428; brick, 2.898; asphalt, 0.644; asphalt block, 0.485; plank, 0.313; dirt, 86.974. Gutters having a total length of 54.88 miles were as follows: Granite culls, 17.45; cobbles, 36.51; flagstones and cobbles, 0.92. Of the 57.995 miles of curb in the city 40.788 miles were of bluestone, 15.354 miles were of granite and 1.853 granolithic.

The report also shows that during the ten years ending December 31, 1911, the sum of \$28,057.99 was expended for the removal of snow and ice. The greatest amount was expended in 1903 when the cost was \$8,049.79, and the smallest amount expended in any one year was \$620.42 in 1906. The amount expended in 1911 was \$1,871.61, while the average annual cost for the ten years was \$2,805.80.

Street cleaning in 1911 cost the city \$28,789. The cost of cleaning the so-called permanent pavements, those on Broadway, Washington Square, Long Wharf, Spring St.

and Thames St., was \$11,103.35. The cleaning of all other streets, which was carried on only between Apr. 4 and Nov. 17, cost \$17,685.65. The total yardage cleaned on all streets was 50,546,666, and the total number of loads removed 8,709.

Street watering during the year cost \$9,292.86, an average of about \$154.88 per mile for the season. The number of "watering days" was 57 less in 1911 than in 1910, although the season was very dry. About 60 miles of streets were watered an average of twice a day. The report contains tables showing the work done by each cart, giving the number of days in each month that the cart was used, the number of gallons of both fresh and salt water used and the mileage and area of street watered. Another table, consisting of a comparative statement of street watering from 1907 to 1911, inclusive, shows the number of days for all carts, the number of gallons of salt and fresh water used and the mileage and area of streets watered, each year.

One portion of the report is devoted to a detailed statement of the work done during the year with dust layers of various kinds.

A detailed report is given of the work of quarrying and crushing stone which began on March 9 and continued until Nov. 14, when the plant was shut down for the winter. The report shows that 1,017 tons of ledge stone and 9,632 tons of crushed stone were quarried and crushed during the year, at costs of \$0.75 and \$1.2077 per ton, respectively.

Repairs to "permanent" pavements were made over an area of 1,697 sq. yds., of which 589 sq. yds. on Broadway, and 841 sq. yds. on Spring St. were on bitulithic pavement, and 267 sq. yds. on Coggeshall Ave. were on Tarvia pavement. Work classed as re-macadamizing was done on Kay St., from Rhode Island Ave. to Bull St.; Touro St., from Clark St. west; Rhode Island Ave., from Old Beach Road, south, and Second St., from Vas Zandt Ave., north. New macadam was laid on portions of Byrnes St., Coddington Wharf, Edgar Court, Gibbs Ave., McAlister St., Second St., Sheffield Ave. and New St., and telford macadam was laid on sections of Bellevue and Wellington Aves. Portions of the following streets were resurfaced: Annandale Road, Bellevue Ave., Bowery St., Chapel St., Francis St., Kay St., Freebody St., Old Beach Road, Perry St., 3d St., Tilden Ave., Touro St., Van Zandt Ave., Vernon Ave. and William St.

A statement of the granolithic sidewalk construction shows that 10,925.4 lin. ft. of walk, having an area of 6,182.5 sq. yds., were laid at a total cost of \$10,372.06, an average of \$1.677 per sq. yd. For the first time in eleven years, the report states, appropriations were made for this work, each street having a separate appropriation. The total amount so appropriated was \$16,150.00. As the cost was only \$10,372.06, a balance of \$5,777.94 remained at the close of the year. The estimates for this work were made on the basis of the cost of similar work in previous years, but favorable weather, low prices for materials and economical work by employees of the Department of Highways permitted the performance of the work at less than the estimated cost.

Other features of the report are a statement of the permits issued for street and sidewalk openings, presented in detail in the form of tables, a financial statement, and an inventory of the property belonging to the department.

The various citizens interested in the construction of the proposed Los Angeles-Colton-Yuma road in California, have secured contributions amounting to \$22,815 for its construction.

New Labor Law Goes Into Effect

The new labor laws enacted by the New York State Legislature at the last session, became effective October 1.

These laws regulate the number of hours for which women and minors employed throughout the state, in any vocation, may work in any one day or any one week, and place restriction on the number of hours in which men may work when engaged in labor directly or indirectly in the employ of the state of New York.

Section 3 of Article 2 reads as follows: "Eight hours will constitute a legal day's work for all classes of employees in this state except those engaged in farm and domestic service unless otherwise provided by law. This section does not prevent an agreement for over work at an increased compensation except upon work by or for the state or a municipal corporation, or by contractors or sub-contractors therewith. Each contract to which the state or a municipal corporation or a commission appointed pursuant to law is a party which may involve the employment of laborers, workmen or mechanics shall contain a stipulation that no laborer, workman or mechanic in the employ of the contractor, sub-contractor or other person doing or contracting to do a whole or a part of the work contemplated by the contract shall be permitted or required to work more than eight hours in any one calendar day except in cases of extraordinary emergency caused by fire, flood or danger to life or property. The wages to be paid for a legal day's work as hereinbefore defined to all classes of such laborers, workmen or mechanics upon all such public works, or upon any material to be used upon or in connection therewith, shall not be less than the prevailing rate for a day's work in the same trade or occupation in the locality within the state where such public work on, about or in connection with which such labor is performed in its final or completed form is to be situated, erected or used. Each such contract hereafter made shall contain a stipulation that each such laborer, workman or mechanic, employed by such contractor, sub-contractor or other person on, about or upon such public work, shall receive such wages herein provided for." The same section provides that nothing in it shall be construed to apply to persons regularly employed in state institutions, or to engineers, electricians or elevator men in the Department of Public Buildings during the annual session of the Legislature, nor to the construction, maintenance or repair of highways outside the limits of cities and villages.

Proposed New Mountain Road in King County, Washington

A delegation made up of members of the Board of County Commissioners of King County and the City Park Board of Seattle, Wash., recently made a trip of inspection over the route of the proposed highway from Seattle to Mount Rainier National Park by way of Naches Pass, and upon their return unanimously indorsed that route.

Existing roads now extend within 20 miles of the northern boundary of National Park. The Legislature will be urged to appropriate money to complete the highway to the boundary, and the government will be petitioned to construct a thoroughfare for 18 miles through the reserve to Grand Park, which is a basin abounding in scenic attractions and at an elevation of 7,000 feet.

This will enable motorists to reach Mount Rainier National Park direct instead of going by way of Tacoma. Eventually, it is planned to have the government construct the road connecting Paradise Valley and Grand Park, which will make it possible for motorists to practically encircle the peak.

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The Proposed Fifty Million Dollar Bond Issue in New York

In a little over a week after this issue of "Good Roads" reaches its readers, the electors of the state of New York will be called upon to decide whether or not New York State shall make a second \$50,000,000 bond issue for the improvement of its roads. Strong efforts have been made to create sentiment in favor of this measure, and there is a more or less general belief among those in touch with the situation that the bonds will be voted.

At this time—twenty years after the first application of state aid by means of an organized state highway department and when the majority of the states of the Union have adopted that principle—it would seem unnecessary to repeat the arguments which have been made over and over again during the past years as to the advantages of good roads and the necessity for building them. And in New York, where since 1898 state aid has been given for the construction of roads, it would seem that the benefits of the improved highways must be evident to everyone. Nevertheless it is probably true that there exists in certain sections and among certain classes a real, though perhaps not active, opposition to further road improvement, especially if it is to be paid for by means of state bonds.

That this should be so is a matter of regret to all those who, with a clear understanding of the highway situation in New York State, are anxious to see the work commenced in 1898 carried on to completion. Whatever opposition to the making of a second bond issue exists is without doubt due to a lack of information concerning past operations under the state aid law and the work planned for the future, for the completion of which additional funds are necessary.

When the Higbie-Armstrong and the Fuller-Plank laws were passed in 1898, provision was made for the construction of highways under the supervision of the State Engineer and Surveyor, the state paying 50 per cent. of the cost, the county 35 per cent. and the towns 15 per cent., the funds being provided by appropriations. In 1903, the Senate and Assembly passed a joint resolution proposing a constitutional amendment to provide for a bond issue of \$50,000,000 to raise funds for highway improvement. This was passed by a subsequent Legislature and referred to the people at the general election in November, 1905. It

was approved at that election, and became a part of the constitution on Jan. 1, 1906. The next year the Legislature adopted an official road map on which was indicated a system of main or market highways to be improved jointly by the state and the counties. The mileage included in this system was such that at the cost of construction at that time the \$50,000,000 bond issue would have been sufficient for the improvement of the system, but in 1908 a new highway law was passed by which the plans for the improvement of the former county system were retained and in addition plans for the construction of a state highway system, having a mileage of something less than one-half of the county system, were also made. Besides this increase in the mileage to be built, partly by state funds, and the increase in the proportion of the cost borne by the state, the unit cost of construction had increased to a considerable extent, a new kind of traffic had been developed for which a more costly type of road had to be provided and the prices of labor and materials had risen. As a result of these three causes, it has been impossible to build the system of roads originally planned with the funds available for the work, and another bond issue is required to carry the work to completion.

That the state of New York needs the improved highways embraced in the state and county systems, as planned, is beyond doubt. It is equally certain that these improved roads cannot be built unless funds are provided, and the issuing of bonds to provide these funds is in accordance with the usual practice. Any opinion as to whether or not all of the work which has been done under the supervision of the New York State Highway Department has been done efficiently and economically should not be allowed to exert too great an influence in deciding the question of voting the bonds. The art of road building has undergone great changes during the past few years, and, inevitably, mistakes must have been made in the effort to build roads to meet constantly changing traffic conditions. There is no state highway department but that has built roads which have failed, and in judging the work of public officials it must always be borne in mind that adverse criticism seeks out and exploits the few unfavorable acts and unsatisfactory examples of work, ignoring or suppressing the probably more numerous commendable actions and instances of successful work. If maladministration or inefficiency creeps into public work the people have the power to correct the condition, but such correction should not be attempted through the enforced abandonment of all work of improvement by failure to provide funds for its prosecution.

It is the duty of the voters of New York State to go to the polls on Nov. 5 and approve the \$50,000,000 bond issue, not as an indorsement of the work of the present highway commission, or any other highway commission, nor because certain interests are supporting the movement, but because highway improvement in New York should go on, at least until the network of roads now planned is completed, and because it cannot go on unless funds are provided.

Over 100 members of the Tulare County Good Roads Association met at Tulare, Cal., Sept. 30 to hear the report of the general committee appointed at a previous meeting to secure data on county road projects throughout California. After the report had been considered in detail, it was voted to start work at once to secure a bond issue of \$500,000 for a county boulevard system. It is planned to start the main highway of this proposed system at Goshen, and so route it as to touch the centers of population throughout the county. The road as planned will be about 200 miles long.

Coming Meetings

November 12-15.—American Society of Municipal Improvements.—Annual Convention, Dallas, Tex.—A. Prescott Folwell, Secretary, 5 Union Square, New York.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress. Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

General Notes

Plans are being drawn for the construction of a viaduct across the network of railroad lines between Columbus and Wynnton, for the benefit of those who find it necessary to pass over the tracks by trolley, horse-drawn vehicles or other conveyances. The cost is estimated at \$200,000.

According to a recent issue of the "Daily Consular and Trade Reports," a loan has been negotiated in Brazil for the construction of the first section of an automobile road to be built between the cities of Sao Paulo and Santos. It is hoped that when the highway is finished but an hour will be required to go from Santos to Sao Paulo by automobile.

It has been arranged to hold the Indiana Better Roads Convention at the German House, Indianapolis, December 11, 12 and 13. The convention will be held under the auspices of the various trade and commercial organizations of the state. The prime object of the convention will be to obtain the passage of laws on good roads legislation favored by the Indiana Good Roads Association.

At the recent annual meeting of the Ohio Good Roads Federation, a resolution was adopted pledging the federation to work for the enactment of a law at the next session of the Legislature authorizing a direct tax levy of \$3,000,000 for the purpose of furthering the project of an intercounty highway system. The following officers were elected: President, Jesse Taylor, Jamestown; Vice Presidents, F. A. Seiberling, Akron; Harry Vartrib, Toledo; A. P. Sandles, Ottawa; John N. Willys, Toledo; David Dunham, Lebanon; Secretary, H. K. Laird, Columbus; Treasurer, B. S. Humphries, Cleveland; Superintendent, W. A. Alsdorf, Johnstown; Counsel, Smith W. Bennett, Columbus.

The second "Federal Aid Good Roads Convention," under the auspices of the American Automobile Association, will be held at Washington, D. C., on March 6 and 7, 1913.

Personal Notes

R. D. Brown, City Engineer of St. Catharines, Ont., has resigned.

Paul K. Sheidler, of St. Paris, O., has been appointed Assistant Deputy Engineer of the State Highway Department.

C. A. Tupper, a consulting engineer of Milwaukee, Wis., has been appointed a member of the Civics Committee for the purpose of investigating the paving conditions of the city.

L. C. Boone, formerly Highway Engineer of Lancaster Co., S. C., has been appointed Engineer of the Aiken County Highway Commission. His headquarters will be at Aiken.

W. E. Atkinson has been made Chief Engineer of the State Highway Department of Louisiana. Gervais Lombard, one of the Assistant State Engineers, has been Acting Chief Engineer of the Highway Department for some time past, and will devote his attention in future to the charge of the levees. The work of the Highway Department was formerly under the jurisdiction of the State Board of Engineers and has now become a separate department, subject to the supervision of the Board of Engineers.

Trade Notes

The Cooperative Engineers is the name of a new firm which was recently organized to do general street contracting business in Los Angeles, Cal. The firm has opened offices in the Trust and Savings Bank Bldg.

The A. B. Farquhar Co., Ltd., York, Pa., is distributing a 6-page folder describing two types of the Farquhar traction engine, single and double cylinder. The folder is printed in three colors and is illustrated.

The E. I. du Pont de Nemours Powder Co., Wilmington, Del., has issued a booklet on "Explosives for Quarries," describing the various kinds of explosives used for the purpose outlined in the title. The booklet also contains illustrated descriptions of various blasting machines and appliances.

The Dolarway Paving Co. of Oregon and Washington has been incorporated with a capital stock of \$10,000. C. A. Squires, George E. Llewellyn and J. H. Ballinger are the incorporators. The headquarters of the company are at Seattle, Wash.

The Universal Portland Cement Co., 72 West Adams St., Chicago, Ill., is distributing a leaflet advocating the shipment of cement in bulk instead of in sacks. It is argued by the company that cement shipped in this way will cost less, that it will be received at the work in better condition, that it can be handled more cheaply and that for many other reasons the bulk method of shipment is to be preferred.

The Institute of Industrial Research, Washington, D. C., has recently issued Bulletin No. 4, entitled "Bituminous Roads and Pavements and Other Materials of Construction," by Prevost Hubbard, Chemical Engineer in charge of the Division of Roads and Pavements. The bulletin contains about 23 pages of matter descriptive of the various uses to which bituminous material may be put in the construction of roads and pavements, and of the nature and characteristics of those materials.

The Koehring Machine Co., Milwaukee, Wis., manufacturer of concrete machinery, has just issued an attractive pamphlet describing the street paving concrete mixers manufactured by that company. The booklet comprises 30 pages and cover, and is elaborately illustrated with multi-colored half-tones showing various examples of street work in which the Koehring mixer is used. A detailed description of the various types of the machine, with tables of weights and capacities, is also included.

The Standard Scale & Supply Co. of Pittsburgh and Chicago, has just issued Bulletin Y50, describing the Standard 100 charging concrete mixers and other machinery manufactured by the company, including gasoline and steam engines, contractors' hoists, wheelbarrows, carts, trucks, etc., and the Eclipse Concrete Stone or Block Machine and the Perfect Brick Machine. The booklet comprises 32 pages and cover. It is amply illustrated with views of street work in which the various machines manufactured by the company are used, and silhouettes and half-tones showing the different machines and their parts.

CONTRACT NEWS

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Roads and Streets

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ROADS AND STREETS.

Bids Asked and Prospective Work.

Clinton, Ala.—Bids will be received by the Court of Co. Commissioners at the Court House at Clinton, until noon, Oct. 25th, 1912, for grading, draining and surfacing with gravel, approximately six miles of State Aid Road. W. S. Keller, is State Highway Engineer.

Marion, Ala.—Bids will be received by the Court of Commissioners of Perry Co., Ala., until 2 p. m., Nov. 11, 1912, for grading about four miles of the Hamburg Road.

Expenditures of \$8,000. Certified check for \$400 required. The right is reserved to reject any or all bids.

Profile and specifications may be obtained in office of Geo. C. Scales, County Engineer.

Vernon, Ala.—Bids will be received by the Court of Co. Commissioners of Lamar Co. at the Court House at Vernon, until 11 a. m., November 7, 1912, for grading, draining and surfacing with gravel approximately four miles of the Sulligent and Vernon Road. W. S. Keller is State Highway Engineer.

Phoenix, Ariz.—Plans will be submitted to the city council at once for paving Central ave. for a length of three miles. The cost will be between \$25,000 and \$30,000.

Paragould, Ark.—The City Council is planning to pave several streets. Address Mayor.

Lompoc, Cal.—A movement is on foot for the construction of a macadamized road from Lompoc to Harris Station, over the La Purisima grade.

Los Angeles, Cal.—Phil Denitz, capitalist, 225 San Fernando Bldg., wants bids from local contractors for the improvement of a 50 acre tract at Redlands, the work to consist of grading and oiling streets, cement curbs, gutters and sidewalks, water and sewer pipes. City Engineer Hickley of Redlands is engineering the work.

National City, Cal.—The council is planning to pave National ave. with asphalt. Address City Clerk. Two and one half miles of pavement will be laid at a cost of \$103,000.

Redlands, Cal.—The Austin and Clark Realty Co. is having plans prepared for the construction of streets consisting of grading, oiling, curbs, gutters, sidewalks, ornamental street lights, gas and water pipes in the Huizing tract.

San Diego, Cal.—The City Council has ordered the paving of Fifth St., from H St. to the water front. The estimated cost is placed at \$20,000.

San Diego, Cal.—Engineer Fred Rhodes has completed plans for a twelve-mile road between Mountain Springs and Coyote wells, on the road to Imperial valley, the cost to be borne by the San Diego Chamber of Commerce. The cost is estimated at \$3,500 a mile, the length of the improvement being twelve miles. The sum of \$50,000 is available.

Broderick West Land Co. will let the contract for grading streets and constructing sidewalks, curbs and gutters on a 15-acre tract bounded by Thirty-eighth, Fortieth, R and T Streets.

Engineer W. O. Sanford has completed surveys and bids will at once be taken for the construction of streets and sidewalks at Mission Beach for Sullivan & Sullivan of Los Angeles.

Moscow, Ia.—Bids will be received until 8 p. m., October 28, for paving about 30 blocks of the city streets at an estimated cost of \$137,000.

Chicago, Ill.—The County Court of Cook County, Ill., has rendered judgment for a special assessment upon property benefited by the following improvements: Paving the alley between 25th and 26th Sts., between Armour Ave. and Dearborn St.; paving the alley in the block bounded by Indiana, Illinois, Pine and St. Clair Sts.; paving Ontario Ave., between 132d St. and Howard Ave.

Freeport, Ill.—City Engineer Chas. S. Hepner is preparing plans for the improvement of Cottonwood, Foley and Powell Streets, at the request of property owners. Work will be started next spring.

Sterling, Ill.—The Council is planning to repair certain streets and construct concrete gutter. Address Mayor McDonald.

Decatur, Ind.—The City Auditor has been ordered to advertise for bids for the construction of macadam paving on the Haugh road. Bids will be received Nov. 6.

Evansville, Ind.—Sealed proposals will be received by the Bd. of Commrs. of Vanderburg Co. until 10 a. m., Nov. 7, for improving St. Joseph and Cynthiana Road, Green River Road, and the Boonville Road in German and Scot Twp., by grading, draining and paving, in accordance with plans, specifications and profiles on file in the office of the Co. Auditor. C. P. Beard is Auditor.

Lyons, Ia.—The Council is planning to pave several streets. Address City Clerk.

Leavenworth, Kan.—Bids will be received Nov. 11 for the improvement of Leavenworth Branch Road in Walnut Twp. Address Edward Iverson.

Topeka, Kan.—The Co. Commrs. of Shawnee Co. have decided to build a boulevard on the half mile stretch of road extending south of the new brick plant bridge to the west end of Gage Park.

Dayton, Ky.—The Council is planning to expend \$20,000 to improve 6th Ave. Address Mayor Quinby.

Bellevue, Ky.—The Council is planning to expend \$60,000 in paving. Address Mayor Cassidy.

Clinton, Miss.—The Town Council has ordered the construction of a concrete walk along the north side of the gravelled street, running from the eastern limits of the corporation to the entrance of the Mississippi College campus.

Jefferson City, Mo.—Nov. 4 bids will be received for all labor necessary for the construction of High St., from Harrison St. to Bolivar. Said construction to consist of curbing and guttering with cement material, macadamizing with an asphalt binder. Address Phil C. Harding, City Engineer.

Newark, N. J.—The report of the commissioners in the matter of assessments for paving Custer, Malvern and Vernon Aves. and S. 17th St., has been received by M. R. Sherrerd, Chief Engr.

Belmont, N. Y.—At a recent special village election the proposition to pave Schuyler St. and build a macadam road in Washington St. in conjunction with the state highway, was carried.

Danville, N. Y.—At a recent special election held for the purpose of voting on the question of paving Main St. with brick, the result was in favor of the improvement.

New York, N. Y.—Sealed bids or estimates will be received by the President of the Borough of The Bronx at his office until 10.30 a. m., October 9, 1912, for constructing a sewer

and appurtenances in Tiffany St., between Whitlock Ave. and Garrison Ave., together with all the work incidental thereto. For constructing a sewer and appurtenances in Taylor Ave., between Wood Ave. and Westchester Ave.; and in Beach Ave., between Wood Ave. and Randolph Ave., together with all the work incidental thereto. For regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in East 193d St., from Bainbridge Ave. to Webster Ave., together with all work incidental thereto. For regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in McGraw Ave., from Unionport Road to Beach Ave., together with all work incidental thereto. For regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in 242d St., from the Easterly side of Katonah Ave. to the Northerly boundary line of the City of New York, together with all work incidental thereto. For regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Dorsey St., from Zerega Ave. to Seddon St., also building drains, walls, etc., together with all work incidental thereto. For completing the contract which was executed by Zingales and Delena on July 26, 1911, and declared abandoned September 19, 1912, for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in St. Lawrence Ave., from West Farms Road to Westchester Ave., together with all work incidental thereto. For regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in and paving with asphalt blocks on a concrete foundation the roadway of Barretto St., from Southern Boulevard to Whitlock Ave., together with all work incidental thereto. (Permanent pavement.) For repaving with sheet asphalt on a concrete foundation the roadway of Clay Ave., from East 165th St. to East 166th St. and setting curb where necessary, together with all work incidental thereto. For paving with bituminous concrete on a cement concrete foundation the roadway of West 261st St., from Riverdale Ave. to Broadway, and setting curb where necessary, together with all work incidental thereto. (Preliminary pavement.) For paving with bituminous concrete on a cement concrete foundation the roadway of Devoe Terrace (Park View Pl.), from Webb Ave. to West 190th St., adjusting curb where necessary, together with all work incidental thereto. (Preliminary pavement.)

Winston-Salem, N. C.—The Bd. Co. Commrs. of Forsyth Co. has ordered the repaving of the sidewalks around the Court House square and the walks across the square.

Alliance, O.—An ordinance has been passed authorizing the levying of a special tax to pay the cost of grading, draining, setting curb, and paving with brick South St., between Arch and Liberty Aves.

An ordinance has been passed authorizing the levying of a special tax to pay the cost of curbing and paving with brick block E. State St., between Arch and Union Aves.

An ordinance has been passed authorizing the levying of a special tax to pay the cost of grading, setting curb and paving with brick Ridgewood Ave., between State St. and the South Corporation line. E. P. Spidel is Mayor.

Cincinnati, O.—An ordinance has been passed authorizing the appropriation of property to public use for opening and extending Pueblo St., between Alma and Sycamore Sts.

Cincinnati, O.—Oct. 30, bids will be received for the improvement of many streets by curbing and macadamizing. Address V. T. Price, Director of Pub. Service.

Cincinnati, O.—Sealed proposals will be received at the office of the Director of Pub. Service, City Hall, Cincinnati, Ohio, until noon, Oct. 30, 1912, for the improvement of Spring St., from Reading Road to East 12th St., by grading, setting stone curbs, paving the roadway with brick and wood blocks, constructing the necessary drains and inlets, laying new six-inch water main and removing the present four-inch water main. Plans, specifications and blank proposals can be obtained at the office of the Chief Engineer, Department of Public Service. V. T. Price, Director of Public Service.

Sealed proposals will be received at the office of Director of Pub. Service, City Hall, Cincinnati, until noon, Oct. 30, 1912, for the improvement of West Eighth Ave., from west line of old St. Joseph's Cemetery to new St. Joseph's Cemetery by grading, setting granite or Medina sandstone curb, and paving the gutters with brick, macadamizing the roadway with a special binder and finishing course, constructing the necessary drains, inlets and retaining walls and laying a six-inch water main.

Sealed proposals will be received at the office of the Director of Pub. Service, City Hall, Cincinnati, until noon, Oct. 30, 1912, for the improvement of Harris Ave., from St. Lawrence Ave. to Eighth Ave. (formerly Eighth St.), by grading, setting cement combined curb and gutter, macadamizing the roadway with tar binder and finishing course, and constructing the necessary drains, inlets and retaining walls. Plans, specifications and blank proposals can be obtained at the office of the Chief Engineer, Department of Pub. Service.

Cleveland, O.—An ordinance has been passed determining to proceed with the improvement of Ostrand Ave. N. E., to E. 99th St. and E. 105th St. by grading, draining, curbing and paving.

An ordinance has been passed authorizing the acceptance of the dedication of Juneau Ct., S. W. from W. 18th St. to W. 19th St.

An ordinance has been passed authorizing the levying of a special tax to pay the cost of grading, draining, setting curbs and paving Beman Ave. S. E., from Warner Rd., S. E. to 1490 ft. westerly.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Nov. 1, 1912, for grading and paving with a waterbound macadam the Springfield and Urbans. Rd. in Moorfield Twp., Clark County. Length, 5,280 ft.; width, 16 ft. Estimated cost of construction, \$6,278.46.

Plans and specifications are on file in the office of the Co. Commissioners and the State Highway Department.

Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m., Nov. 1, 1912, for grading and paving with a concentrated sulphite liquor treated slag macadam, the Wauseon Delta Road, in Clinton Twp., Fulton County. Length, 5,371 ft.; width, 12 ft. Estimated cost of construction, \$7,125.40.

Plans and specifications are on file in the office of the Co. Commissioners and the State Highway Department. James R. Marker is State Highway Commissioner.

Dayton, O.—An ordinance has been passed determining to proceed with the improvement of the first alley south of Margaret St., from the first alley east of Wayne Ave. to the first alley west of Gunkel St. by paving with brick or cement.

An ordinance has been passed authorizing the levying of special assessments for the improvement of Gillespie St., from Burkhardt Ave. to 5th St. by grading, and graveling the roadway, setting combined curb and gutter of cement and paving the sidewalks with cement.

An ordinance has been passed authorizing the levying of special assessments for the improvement of Wayne Ave., between Epworth Ave. and Arbor Ave., by setting cement curb and paving with Trimble block.

An ordinance has been passed authorizing the levying of special assessments for the improvement of Glendale Ave., between Oxford and Cambridge Aves., by grading and graveling the roadway, setting combined curb and gutter of cement and grading the sidewalks.

An ordinance has been passed determining to proceed with the paving of the alley west of Gunkel Ave., from Margaret St. to Gebhart St. with brick or cement.

An ordinance has been passed determining to proceed with the improvement of the alley south of Glencoe Ave., between Wayne and Gunkel Aves. by paving with brick or cement.

An ordinance has been passed determining to proceed with the improvement of the alley east of Wayne Ave., from Margaret St. to Gebhart St. by paving with brick or cement.

An ordinance has been passed determining to levy special assessments for the improvement of Kirkham St., from Bolander Ave. to Smith St. by grading and graveling the roadway and setting combined curb and gutter of cement, with boulder border, two ft. wide. Wayne E. Lee is Clk. of the City Council.

Pittsburgh, Pa.—An ordinance has been passed authorizing the Mayor and the Director of the Department of Public Works to advertise for bids for repaving 5th Ave., from Simmonston St. to a point 100 ft. south of Hamilton Ave.

Pittsburgh, Pa.—An ordinance has been passed authorizing the grading, paving and curbing of Lilac St., from Weifer's line to William Pitt Blvd.

Bonham, Tex.—The City Council has ordered the paving of S. Center St., between the Texas and Pacific tracks and the public square. Petitions for other paving are under consideration by the Council.

Houston, Tex.—Sealed proposals will be received at the office of Ian C. Smith, Jr., City Comptroller and City Secretary, until noon, Nov. 11, for the following street work: Constructing bitulithic pavement on 5 inches of concrete on Austin St., from Texas Ave. to McGowan Ave.; constructing creosoted wooden blocks on 5 inches of concrete on Fannin St. from McKinney Ave. to Leland Ave., and constructing creosoted wood block pavement on 5 inches of concrete on Lamar St., between Main and Crawford Sts. H. B. Rice is Mayor.

Nov. 11th, bids will be received for grading and paving several streets throughout the city. Address H. B. Rice, Mayor. The material to be used is creosoted block.

Point Grey, B. C.—This municipality will expend \$120,000 in clearing and grading roads. B. A. Cunliffe, Kerrisdale, B. C., is secretary of the Municipal Council.

Vancouver, B. C.—The Westminster Roads Improvement Assn. has petitioned the City Council to pave Westminster Road. It is stated that the government has pledged its support.

Winnipeg, Manitoba.—Granolithic sidewalks will be laid on William Ave., between Isabella and Tecumseh Sts. N. Peterson is secretary of the Bd. of Control. H. N. Rutten is City Engr.

Duck Lake, Sask.—Cement sidewalks will be laid at a cost of \$10,000. O. S. Dennis is secretary of the Town Council.

Kamauak, Sask.—A by-law has been passed providing \$13,000 for the construction of cement sidewalks and \$5,000 for street grading. John Bowes is secretary of the Town Council.

Regina, Sask.—The City Commissioners propose the laying of 20 miles of concrete sidewalk in 1913, also the paving of 8 miles of streets. A. W. Pool is City Clk.

Rosthern, Sask.—A by law was passed October 5, providing for the expending of \$10,000 for the construction of sidewalks. George Brade is Town Clk.

Wynyard, Sask.—A by law was voted upon October 14, to provide \$10,500 for sidewalks. Frank Hueks is secretary of the Town Council.

Bids Received and Contracts Awarded.

Birmingham, Ala.—Contracts for paving 1st Ave., between 18th and 21st Sts., and 20th St., between Railroad and 4th Aves., have been awarded by the City Comm. to McMartin Constr. Co., at \$29,550.50 for the 1st Ave. work, and \$28,557 for the 20th St. work.

Los Angeles, Cal.—O. L. Stevens was awarded a contract for improving Catalina St., from Fifth to Sixth Sts., at \$5,500 for grading and graveling; 35 cts. for cement curb; 15 cts. for cement gutter; 12 cts. for cement sidewalk; \$450 for corrugated iron pipe culverts; total, \$5,465.

H. H. Curtis was awarded the contract for improving Townsend St., from Sunset Blvd. to Willoughby Ave., at \$1.40 per lin. ft. for grading and graveling; 13 cts. for regrading; 35 cts. per sq. ft. for cement curb; 15 cts. per sq. ft. for cement gutter; 30 cts. per sq. ft. for vitrified block gutter; 11 cts. per sq. ft. for cement sidewalk; \$170 for storm drain. Total, \$16,292.2.

R. N. Nikcevic was the low bidder for street improvement and storm sewer construction in Utah, Kearney and Gless Sts., the bed of the Los Angeles River and other streets at 13 cts. for regrading, 50

cts. for granite block gutter and \$19,387 for storm drains and appurtenances.

Pasadena, Cal.—Bids for the improvement of Rio Grande St., from 451 Molino Ave. to the east city line were received by the City Council on Oct. 15. The Baldwin Const. Co. bid (a) grading, \$2,240 lin. ft., 60 ft. wide, at 66 cts.; (b) curbing, 2,400 lin. ft., 12 in. wide, at 26 cts.; (c) gutter, 12,200 sq. ft., at 14 cts.; (d) sidewalks, 24,300 sq. ft., at 9 cts.; (e) oiling, 2,430 lin. ft., at 70 cts.; (f) sewer, 14 in., at \$526. Total, \$8,982.30. W. A. Dontanville (a) \$1.05, (b) 25 cts., (c) 14 cts., (d) 10 cts., (e) 2½ cts., (f) \$623.75; total, \$9,920.75.

Santa Monica, Cal.—The following bids were received by the Board of Trustees for improving Oregon Ave. Braun, Bryant & Austin, 17½ cts. for paving, 10½ cts. for sidewalk, 35 cts. for curb, 19 cts. for gutter, palms, \$3.05 each. Fairchild-Gilmore-Wilton Co., 19 cts. paving, 12 cts. sidewalk, 32 cts. curb, 19½ cts. for gutter, palms, \$2.25. J. D. Kneen, 20½ cts. paving, 12 cts. sidewalk, 32 cts. for curb, 21 cts. for gutter, \$2.60 for palms. Kaw Co., 21 cts. paving, 12½ cts. for sidewalk, 36 cts. curb, 18 cts. gutter, palms, \$2.65. Braun, Bryant & Austin were the lowest bidders.

Braun, Bryant & Austin were the lowest bidders for improving Fourteenth and Seventeenth Sts., with intersecting avenues at 81 cts. for sewer, 9 cts. paving, 10 cts. sidewalk, and 35 cts. for curb.

J. D. Kneen was the lowest bidder for improving Nineteenth st. at 11½ cts. for sidewalk and 31 cts. for curb.

P. W. Snyder & Co. were the lowest bidders at \$12.40 per ft. for constructing 2,000 ft. of the Ocean Front Promenade; total, \$24,800. The other bids were J. D. Kneen Co., \$13.49 per ft.; Pearson & Anderson, \$13.70; M. C. Tuttle, \$16.00, and Braun, Bryant & Austin, \$14.60.

The Kaw Co. was the low bidder for improving Fremont Ave., at 6.5 cts. for grading and oiling, 21.5 cts. for paving, 15 cts. for sidewalk, 37½ cts. for curb, 20 cts. for gutter, \$1.32 for palms, \$92.15 for lamp posts.

The Kaw Paving Co., California Bld., Los Angeles, was awarded the contract at \$92,000 for improving Fremont Ave., from Ocean Front to the City limits. The bids were 6.5 cts. for grading and oiling, 21.5 cts. for paving, 15 cts. for sidewalk, 37.5 cts. for curb, 20 cts. for gutter, \$1.32 for palms, \$92.15 for lamp posts.

Braun, Bryan and Austin were awarded the contract for improving Oregon Ave., from Fourth St. to the City limits, at 17½ cts. for paving, 10½ cts. for sidewalks, 35 cts. for curb, 19 cts. for gutter, \$3.05 for trees.

B. M. Snyder & Co. were awarded the contract at \$24,800 for the construction of 2,000 ft. of cement walk on the ocean front.

Mattoon, Ill.—The contract for the construction of paving in the 10th St. paving district has been awarded to Bresee & Brown at \$22,643.45.

Urbana, Ill.—The Board of Local Imp. awarded the contract for widening the pavement and installing a new concrete curb and gutter on East Main St. to J. W. Stipes, for approximately \$3,000.

Decatur, Ind.—The following bids have been received for street work: Paving 9th St., E. Woods, \$4,591.34; Meyers, \$4,600.04; paving Ruggs St., E. Woods, \$2,608.72; Meyers, \$2,646.45. The contracts for both streets were awarded to E. Woods.

Lafayette, Ind.—The Bd. Co. Commrs. of Tippecanoe Co. have awarded the contracts for the construction of the Marsteller Road in Wabash Twp. to Snyder & Barnett of Frankfort, at \$3,395, and for the construction of the Hudlow Road in Wea Twp., at \$2,485.

Vincennes, Ind.—The contract for the construction of the Steimel Road has been awarded by the Bd. Co. Commrs. of Knox Co. to Ben Antleitner, at \$668.50.

Great Falls, Mont.—The following contracts have been awarded for street work: Constructing concrete pavement in Second alley south between 2d and 3d Sts., Two Miracle Concrete Corporation, at \$1,120.43; boulevarding 5th St. north, from 4th to Park Drive to Alfred Malmberg, at \$439.04.

Columbus, O.—The contract for grading and paving with brick for medium traffic, the Chester Road in Chester Twp., Meigs Co., length, 5,280 ft.; width, 10 ft.; has been awarded to George E. Bowers, Midlandport, O., at \$9,760.50.

The contract for grading and paving with waterbound macadam with the bituminous surface treatment of the Columbus Road in Perkins Twp., Erie Co.; length, 5,300 ft.; width, 12 ft., has been awarded to F. X. Riedy, Castalia, at \$3,999.

Marion, O.—Judge W. E. Scofield has issued a peremptory mandamus writ directing Service Director Edw. Brandt to award a street paving contract to J. & M. Doyle of Erie, at their bid of \$19,600. Director Brandt had awarded the contract to the Cleveland Trinidad Paving Co., of Cleveland, O., at \$22,600, having rejected the bid of J. & M. Doyle on a technicality.

Providence, R. I.—The following bids have been received for state highway work: Constructing 3,000 ft. of highway in Lincoln, O., W. Rackle, Providence, \$5,162.78; constructing 6,500 ft. of road in Narragansett, to Bristoe Bros. & Knowles, \$7,868.95; a mile of highway in N. Providence, Chas. E. Horne, of Millbury, Mass., \$7,459.14; Amos D. Bridges & Son, Hazardville, Conn., \$7,034.81; Joseph McCormick, East Providence, \$7,111.55; O. W. Rackle, Providence, \$6,915.62.

Salt Lake City, U.—A contract for street paving has been awarded by the City Comm. to P. G. Moran, at \$61,382.13.

Spokane, Wash.—Commr. of Pub. Wks. D. C. Coates has recommended that the City Council award the contract for improving Crown Ave., by grading and curbing, between Stanford and Division Sts., to C. M. Payne, at \$3,900, and for curbing and sidewalk 11th Ave., between Arthur and Ivory Sts., to J. B. Mitchell, at \$1,397.

Winnipeg, Man.—The contract for 70,000 sq. yds. of concrete paving has been awarded by the Public Markets, Ltd., to the Hurst Engrg. Co., Ashdown Block, Winnipeg.

BRIDGES.

Bids Asked and Prospective Work.

Phoenix, Ariz.—Plans are being drawn by the State Engineer for a bridge to be constructed across the Gila River, twenty miles north of Yuma.

Little Rock, Ark.—Sealed bids will be received at the office of the Board of Public Affairs, until 3 p. m., Nov. 8, for the construction of a concrete, steel viaduct on W. 3d St. Estimated cost, \$75,000. Chas. E. Taylor is President of the Bd. Pub. Affairs and H. Levinson is Engr.

Fort Smith, Ark.—The Board of Pub. Affairs has advertised to receive bids on November 8 for the construction of the largest concrete bridge in the state. It will be a structure spanning a deep ravine in the west end of the city, over the Rock Island and Iron Mountain Roads, now crossed by a wooden viaduct. It will cost \$75,000.

Placerville, Cal.—The Board of Supervisors ordered a new bridge built to replace the structure now in use in Lake Valley. This will cost approximately \$1,000.

Sacramento, Cal.—The Bd. Spvrs. of Sacramento, Cal., have decided upon the construction of a number of steel and concrete bridges.

Bids for constructing the bridge over the San Diego River at Old Town, will be called for as soon as money from the bond issue is available, which will probably be next month. The amount voted May 7 was \$17,000. D. K. Adams is Superintendent of Streets.

Santa Barbara, Cal.—Eng. Mayberry & Parker, O. E. Bld., Los Angeles, are completing plans for the East Boulevard Bridge. Estimated cost, \$14,000.

Ventura, Cal.—Bids will be received up to Nov. 7, by the Board of Supervisors of Ventura Co. for the construction of approaches to the Ventura River bridge across W. Main St. The work requires: Earth fill east side 12,100 cu. yds.; earth fill west side, 10,900 cu. yds.; concrete in bridges, 288 cu. yds.; routed boulder facing, 288 cu. yds.; bituminous macadam, 62,680 sq. ft.; standard road fence, 3,164 lin. ft.; reinforcing steel, 22,900 lbs.; corrugated metal pipe, 10 ins. diam., 42 ft. J. B. McCloskey, clerk.

Corydon, Ind.—At a recent meeting of the Co. Council of Harrison Co. an appropriation of \$6,000 was made for the erection of a new bridge at the south end of Market St. in Corydon.

Ft. Wayne, Ind.—The Council recommends construction of a steel bridge at Gayshire, over the Pennsylvania road. Address Philip Wyes, building inspector.

Dyersville, Ind.—Preparations are now under way for the construction of a new steel bridge over Bear Creek on the southwest road leading out of Dyersville to replace the wooden structure now standing.

Shakopee, Minn.—October 28 bids will be received for building state bridge No. 694 on State Road No. 16, in the town of Helena, in Scott Co. Plans and specifications may be seen at the above named

office, or at the office of the State Highway Commission at St. Paul. Plans are to be submitted by the respective bidders, which shall comply with the specifications of the Highway Commission. Address County Auditor, A. J. Mayer.

Chillicothe, O.—Sealed proposals will be received at the office of the Co. Auditor of Ross Co. until noon, Oct. 28, for the construction of a bridge across the middle fork of Salt Creek in Jefferson Twp. on the Jackson-Vigo Pike, about half a mile from West Junction. Robert D. Alexander is Co. Auditor.

Cleveland, O.—Sealed proposals will be received at the office of the Bd. Commrs. of Cuyahoga Co. until 11 a. m., Nov. 2, for the construction of bridge work, fill and excavation, 500 ft. south of North Woodland Road, Orange Twp., in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Co. Surveyor. John F. Golds-bogen is Co. Clk.

Chandler, Okla.—Nov. 8 bids will be received for the erection of 41 steel bridges, including substructures in Deep Fork Drainage District No. 1, in Lincoln Co., Oklahoma, such proposals or bids to be in conformity to the plans and specifications on file in the office of the County Clerk of Lincoln County. Address J. E. Rea, County Clerk.

Nov. 8 bids will be received for the construction of two steel bridges with concrete abutments and floors to be built between section 26 and 27-16-3 and 27 and 28-16-3, said bids to be on file with the County Clerk of Lincoln County, Oklahoma, on or before 2 o'clock. Said bridges to be built according to plans and specifications now on file in the office of County Clerk. Address J. E. Rea, County Clerk.

Roseburg, Ore.—The St. Comm. reported favorably on the petition for a bridge across Deer Creek, at the foot of Pitzer St. and the City Engineer was instructed to prepare plans and furnish an estimated cost of the same.

Johnstown, Pa.—The council is planning to construct a bridge between the 7th and 8th wards. Address Mayor Canfield.

Pittsburgh, Pa.—The Kennywood Park Amusement Co. intends erecting a frame bridge 20 ft. wide and 150 ft. long with concrete pier foundations. Architect Edward P. Boch has the plans.

Austin, Tex.—The Council is planning to build three bridges. Address City Engineer.

Davenport, Wash.—County Commissioner S. T. McDonald, Martin Engleson and R. A. Riffe have advertised for sealed bids, to be opened Nov. 6, for three steel bridges. One of the bridges will be built across Crab Creek, one mile north of Bluestem, 60 ft. long and 20 ft. wide, one to be built across Wilson Creek, one mile east of Almira, 50 ft. long and 18 ft. wide, and the other will be constructed across Sagebrush canyon, 7½ miles west of Harrington on the Lake Creek road and will be 40 ft. long and 20 ft. wide.

Calgary, Alberta.—Plans have been prepared for a reinforced concrete bridge, 12 arch spans, 2 concrete approaches and towers. M. Miller is City Clk.

Coquitlam, B. C.—The Dent. Pub. Wks. of the Provincial government will call for tenders shortly for combined tramway and vehicular bridge. J. E. Griffith, Victoria, is engineer.

Winnipeg, Manitoba.—Tenders will be called late in the present month for the construction of a steel bridge across the Red River for the Elm Park Co., Ltd., 507 McArthur Bldg., Winnipeg. Prof. Brydone Jack, University Bldg., Broadway, Winnipeg, is the engineer. The bridge will be a fixed span of 220 ft. with a swing span of 278 ft., approaches will be of the deck girder type. Plans and specifications are on file in the office of the engineer.

Bids Received and Contracts Awarded.

Santa Ana, Cal.—The Young Const. Co., Hibernian Bldg., Los Angeles, has entered into an agreement with the Board of Supervisors to build the W. Fifth St. reinforced concrete bridge across the Santa Ana River on the basis of cost and labor and material plus 15%. The contract had previously been awarded to R. L. Hogue, who could not execute it. If the cost runs over \$18,350, the surety company on Hogue's bond must pay the balance.

Santa Barbara, Cal.—The Santa Barbara Paving and Grading Co., which has been awarded the contract at \$78,940 for the paving of 9½ miles of the permanent road dist. of Carpinteria, will construct an asphalt plant near the Higgins mine. The plant will cost about \$5,000 and will be operated by the company, which will employ about 30 men.

Ventura, Cal.—M. E. Isham was awarded the contract by the County Board of Supervisors for the construction of the Simi bridge at \$7,150. Munoz & Munoz, of Los Angeles, was awarded the contract at \$3,873 for constructing the Arroyo Tapo bridge. The following are the bids received: (a) for both bridges, Westlake Construction Co., \$10,300; H. C. Mayer, \$7,150; Putnam Co., \$7,925; Midland Co., \$8,253. The Simi bridge will be 120 ft. long, 2 concrete abutments and 2 concrete piers, requiring 260 yds. concrete, 34,400 lbs. steel and 520 yds. fill. The Arroyo Tapo bridge will require 162 yds. concrete, 9,600 lbs. steel, 1,700 yds. fill and 620 lin. ft. fence.

Colorado Springs, Colo.—The Crescent Construction Co.'s bid of \$6,700 was the lowest received by the Co. Commissioners for a new bridge at Pike View.

Lewiston, Id.—The contract for the construction of a wagon bridge across the Clearwater River has been awarded to A. L. Hewett, Billings, Mont., at \$46,000.

Centralla, Ill.—The contract for the construction of a new steel bridge to be erected across Crooked Creek has been awarded to H. H. Linder, of Centralla, at \$698.

Elyria, Ill.—The Highway Commrs. have awarded the contract for building a concrete bridge over Taylor Creek at North State St. to F. O. Panton, of S. Elgin, at \$2,790.

Goshen, Ind.—Contracts for the construction of two bridges over Colbus Creek in Cleveland Twp. have been awarded to the Elkhart Bridge & Iron Works, Elkhart Ind., at \$1,475 and \$1,075.

Gulfport, Miss.—The Bd. Spvrs. of Harrison Co. has awarded the contract for building the Richards steel bridge near Lorraine to Austin Bros., at \$1,080.

Cincinnati, O.—The Co. Commrs. of Hamilton Co. have awarded the contract for the construction of bridges and culverts on the Batavia Pike to Wm. Nickerson at \$6,642.50.

Doylestown, Pa.—The contract for the construction of a concrete bridge over Herkiaken Creek, Bucks Co., has been awarded to Riegelsville Constr. Co. at \$1,370.

Jersey, Pa.—The contract for a new bridge on a road leading from Salem to the Salem Country Club has been let to Edward Steelman, of Salem, for \$840.

BONDS.

Fort Payne, Ala.—Nov. 5 an election will be held to vote on the question of issuing \$105,000 4% 30 year road bonds. Address Judge James A. Croley.

Phoenix, Ariz.—The City Trustees will call a bond election soon for the continuation of the pavement on Central Ave. The distance is 3½ miles and the estimated cost of the improvement is placed at \$30,000. Macadam pavement is favored.

Pomona, Cal.—A bond election will soon be called for voting funds for paving with asphalt 13.24 miles of streets.

Whiteford, Mich.—There will be submitted at the November election a proposition for issuing \$10,000 in bonds for the purpose of improving the road connecting the stone road out of Toledo and extending northwest through the township of Whiteford.

Camden, N. J.—An ordinance has been passed authorizing the issuance of \$90,000 in bonds, the proceeds of which will be used for the permanent improvement of streets and highways in the city of Camden.

N. Tonawanda, N. Y.—Sealed bids will be received by the Common Council of N. Tonawanda, on the evening of Nov. 12, for the sale of bonds, amounting to \$32,000, the proceeds to be used for the improvement of Main and William Sts. and Sawyer Creek Road. The bonds to be sold will bear interest at 4%.

Austin, Tex.—The Attorney General's department approved a bond issue for \$120,000 by Wood Co. for roads and bridges.

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Work of the New York State Department of Highways

By BEVERLEY FLEET*

As the result of much discussion and agitation of the subject of good roads, the Legislature of the state of New York in 1898 enacted a law known as the Higbie-Armstrong law, to begin the work of improvement of highways and \$50,000 was appropriated from the general funds of the state to provide for its share of the improvements, which, under this act, were to be borne jointly by the state, the county and town in which the improvements were to be made, the state paying 50 per cent., the county 35 per cent. and the town 15 per cent. of the total cost.

The State Engineer and Surveyor had sole charge of the work. Appropriations were made annually by the Legislature until 1906 when the original law was amended by what was known as the Cobb bill which provided in place of the fixed percentages that the respective shares of the county and town were to be determined by the assessed valuation of each. Under the provisions of this graduated

scale the percentage to be paid by the wealthier counties and towns remained the same as before, while the percentages to be borne by the poorer were reduced—the very lowest being 8 per cent. for the county and 2 per cent. for the town. The effect of this was, of course, to reduce the available state funds for general highway improvement in order to pay the difference for the poorer counties.

Improvements under this law proceeded in a somewhat random manner—necessarily so from the fact that the initiative had to be taken by the town. In order to secure the improvement of a highway the supervisors of a town had to petition the County Board of Supervisors, who adopted a resolution which was forwarded to the State Engineer and Surveyor who had surveys, plans and estimates made, these being the basis of the contract when it was let.

The law really intended a general distribution of the fund, but while some localities were very quick to take advantage of their opportunities others were exceedingly

*Private Secretary to the Superintendent of Highways, New York State Department of Highways, Albany, N. Y.



PORTION OF HIGHWAY NO. 615, NEW LEBANON-BRAINERD, IN THE TOWN OF NEW LEBANON, COLUMBIA COUNTY
—MACADAM WITH LIMESTONE TOP BUILT IN 1908.



BITUMINOUS MAC ADAM ROAD IN RHINEBECK,
DUTCHESS COUNTY—BUILT IN 1911.



LIMESTONE MACADAM WITH TRAP ROCK TOP IN NEW
HARTFORD, ONEIDA COUNTY—BUILT IN 1911.

slow and an unequal distribution resulted, not through any fault of those charged with the execution of the law, but because of the fact that there was no way to compel backward localities to proceed with improvements.

By 1905 the demand for good roads became so great that at the general election a constitutional amendment authorizing the issuance of bonds to the amount of \$50,000,000 was voted upon favorably. The necessary legal enactments were made by the next Legislature and an appropriation from this bond issue of \$5,000,000 was made for the work of 1906.

The Legislature of 1908 enacted what now is known as the "Highway Law," which became effective on January 1, 1909, under Governor Hughes. Under this act a State Department of Highways was created, consisting of a state highway commission of three members together with necessary subordinate officers and employees. This law also constituted three divisions of the state highway system,

namely, state highways, which were to be constructed at the sole expense of the state; county highways, to be constructed at the joint expense of the state, county and town, as before mentioned; and town highways, to be maintained by a tax raised by the towns, supplemented by state aid, this state aid being based on the amounts raised by the towns at a varying percentage determined by assessed valuation.

In all there are approximately 80,000 miles of public highways in New York state. The state highways, that is those constructed at the sole expense of the state, comprise approximately 3,500 miles and connect the principal centers of population, forming a skeleton system to which the county and town highways are tributary. Had the original plan been adhered to, the State Highway Commission would have had available \$100,000,000 for the improvement of the highways, as a result of the issuance of the \$50,000,000 of bonds, from the fact that the counties and towns were



PORTION OF HIGHWAY NO. 37, WOODSTOCK-SAUGERTIES, PART I, IN THE TOWN OF WOODSTOCK, ULSTER
COUNTY—BLUESTONE CONSTRUCTION, BUILT IN 1902.



AN EXAMPLE OF THE BRIDGES BEING REPLACED BY THE TYPE SHOWN AT THE BOTTOM OF THE PAGE.



A PORTION OF HIGHWAY NO. 37 SHOWN IN THE ILLUSTRATION AT BOTTOM OF OPPOSITE PAGE.

under that act called upon to pay an amount equal to that paid by the state. Subsequent amendments to the law have materially reduced the possible available amount. The adoption of the graduated scale of payment of the shares of the counties and towns has reduced the total available amount to a great extent and the adoption of the state system, by which the state paid the total expense of certain roads, operated to still further reduce the available amount and by subsequent amendments the state's share of the abolition of grade crossings was made payable from the \$50,000,000. The total effect of these items has been to reduce the combined amounts of expenditure by the state, counties and towns to approximately \$65,000,000 instead of \$100,000,000.

Under an amendment to the highway law, made in 1911, Governor Dix established the Highway Commission on its present basis. The Governor, by and with the consent of

the Senate, appoints a State Superintendent of Highways. This official, the State Engineer and Surveyor and the Superintendent of Public Works, constitute the Commission. Governor Dix appointed Wm. H. Catlin, Superintendent. Mr. Catlin had been in office but a few weeks when he died and the present superintendent, C. Gordon Reel, was appointed.

When Mr. Reel took office he found laid out a state highway system consisting of approximately 3,500 miles, and various county systems with a total of 6,500 miles. Of these, 3,000 miles had been completed and 875 miles were under contract. The present commission has completed 581 miles and put 1,847 miles under contract. At the close of the season in November a greater part of the roads now under contract will be completed, and at any event the state is assured of 5,700 miles of improved highways.

The state highways are laid out to connect the largest



LOWVILLE BRIDGE CARRYING THE LOWVILLE-COPENHAGEN HIGHWAY OVER MILL CREEK IN LEWIS COUNTY—REINFORCED CONCRETE ARCH OF 115 FT. SPAN.

centers of population and in fact do connect every city with every other city in New York, the main trunk lines being as follows:

Route 1, which runs from New York City up along the eastern boundary line of the state to Columbia County, where it branches off to Albany.

Routes 2 and 3, which run on the east and west banks of the Hudson River from New York to Albany, there connecting with Route 25, and that with Route 22, which extends to the border line to form the New York link in the great Quebec-Miami Highway. This section will doubtless prove more interesting than any other in the whole highway system. Running up the Hudson Valley, almost always in sight of the river, to Albany, passing near, and in many instances, through the estates of the most noted New York families, by the United States Military Academy at West Point, along the foot of the Catskills, through Kingston, the old capital of New York, and then, north of Albany, through Saratoga Springs and by Lake George, on up into the Adirondacks and along the shores of Lake Champlain to the Canadian border line, it joins the International Highway and the King Edward VII Road, now being built by the Dominion of Canada.

Route 4 branches off from Route 3 at West Point and runs westerly through the southern tier of counties to Lake Erie. Route 6 runs directly from Albany through Schenectady, Utica and Syracuse to Buffalo. A boulevard from Buffalo to Niagara Falls will be completed this year.

Route 30 runs from Niagara Falls along Lake Ontario and through the northern counties joining the Canadian highways at the boundary line just north of Rouses Point—and so on until the whole state is a network of through routes.

The county highways, which are of the same construction as those in the state system and are tributary to them, in turn act as outlets for the 70,000 miles of roads all over the state known as town highways. While a great deal of attention is given to the state and county highways by good roads enthusiasts, few stop to realize the importance of these less interesting roads. The state or county system can never reach its full value until these town roads have been put in such condition as to make improved highways of easy access. In the Highway Department the Bureau of Town Highways, basing state help on the assessed valuation of the town, supervises and assists the towns in a steady improvement of roads of local importance. On December 31, 1911, the commission reported to the legislature that 3,000 miles of such road had been macadamized, 8,000 miles had been improved as gravel roads, 40,000 miles had been shaped to some extent and 26,000 miles still remained in their original condition. Over these roads are hauled the greater part of the farmers' crops, lumber and the natural products of the soil. And how are the farmers, lumbermen and the men engaged in the hundred and one occupations requiring the transportation of heavy and oftentimes perishable produce to avail themselves of the magnificent state and county systems in process of construction by the state, if between their point of production and their market lie from two to ten miles of impassable road? Right here lies the greatest problem that confronts the highway authorities of New York or any other state today.

It is generally conceded that with the expenditure of the money to be derived from the new bond issue of \$50,000,000—if it is voted upon favorably by the people in November—the state will have about reached its limit of large expenditure for good roads for a long while. It would not be good business for the state to bond itself further for this purpose until a good proportion of the bonds already outstanding shall have been redeemed. Consequently, with the completion of the 10,000 miles of the state and county

systems as now laid out, and with the possible addition of 2,000 or 3,000 more miles by the Legislature, there will be a comparatively small amount remaining for town highways—considering the vast mileage.

In regard to the disposition of the funds from the bond issue to be submitted to the voters of New York at the general election in November, the apportionment to the counties is provided for in the bill and cannot be changed by subsequent legislation. The bill provides that the money be distributed among the counties of the state in ratio depending on three factors, viz., population, area and mileage, each to have equal weight. Therefore the amount of money coming to each county can be accurately determined and no other disposition can legally be made of that money. That is, should the apportionment under this bill not be utilized by any county by its failure to raise its share for the construction of that county's highways, the allotment must lapse. No other county may receive all or any portion of an amount some other county may not have seen fit to utilize. As a matter of fact there is no danger of any county's not claiming its share, for they are all thoroughly awake to the necessity of improved highways, and the amount will be quickly spoken for.

The proposition of finding a type of construction that will be both economical and efficient is also among the most serious problems before the state. Although the present method of laying brick roadways has not been in use long enough to obtain actual figures, it is expected that these roads as now built will last for at least 30 or 40 years without repair. If this estimate proves correct, brick will be an economical form of construction in the end, in spite of the first cost of about \$22,000 per mile for a 16-ft. pavement laid on a concrete base. While the commission has laid a great many miles of brick pavement this season, it is, however, limited as to the mileage of this class of pavement which it can construct on account of the first cost. The special laws of 1911 provide that a certain mileage must be constructed with a given amount of money, and in order to construct this mileage the commission has used cheaper forms of construction where the traffic conditions are not so heavy. Automobiles, especially motor trucks, have played havoc with the types of construction which up to a very few years ago would have been perfectly satisfactory.

The commission has also had fair success with a concrete roadway built with a first-class concrete base, 5 or 6 ins. thick, upon which was placed a bituminous wearing surface $\frac{1}{2}$ in. in thickness. This type has been constructed for several years by different paving companies and has given some fair and some few unfortunate results. Bituminous pavement has also been tried in certain cities where the commission has been required to build highways and the conditions made the extra expense an economy. Asphaltic concrete is also being used in several instances, this type being a mixture of asphaltic material and a mineral aggregate mixed while hot and laid upon a concrete foundation. These highways have been built with a view to testing their especial suitability to the various conditions in the state, although they have been in use several years elsewhere and have given satisfaction.

The greater portion of highways the past year have been constructed of bituminous macadam. Macadam has been in use for many years, but the idea of using bituminous material as a binder is a recent practice and is probably more used in New York than in any other section of the country. In this connection the commission is preparing statistics and arranging to adopt some system to regulate the weight of loads to the width of tires. This particular point has been agitated time and again, but the conditions are now such that the commission feels it is imperative that its ideas be put in force.

The Highway Department has, in the head offices at Al-

bany, a Bureau of Research, well equipped for testing all materials used upon the highways under its supervision. Every shipment of brick and sample of stone from every quarry and all oil and asphalt materials to be furnished contractors are submitted to a severe test before they are allowed to be used in the road work.

The commission also has supervision over the building and upkeep of highway bridges, although each locality furnishes its own funds. The commission has put an end to the former method of having bridge contractors submit plans and bids and the awards made by a committee composed of laymen. Now, an expert bridge designer from the department prepares plans, upon which contractors submit their bids. Thus, up-to-date bridges are constantly replacing the old wooden ones. And it is well that this is so, for with the travel on the improved highways constantly increasing and the average weight of load growing greater day by day, something more permanent than wood is needed to withstand the wear and tear. Furthermore, wood as a material of construction is gradually going up in price and down in quality. Repairs to the extent of \$350,000 are made annually in New York state on wooden bridges, and when it is considered that the greater part of this money would be saved were a more permanent form of structure used, it is plainly seen that true economy lies in more enduring materials. In view of these facts, the Highway Commission is urging every town official who has anything to do with the construction of bridges, or the providing of funds therefor, to cause bridges to be built according to carefully prepared plans and in a manner to practically eliminate the repair expense. To this end, town and county officials and highway bridge engineers are constructing bridges and culverts having steel members or reinforcement entirely enclosed in concrete. They are also using concrete floors in place of wood wherever possible. The commission issues a bulletin giving detailed information in regard to the building of culverts or short span bridges. Along with bridges the Highway Commission is pushing the work of eliminating grade crossings, the state's share of the expense, in this instance, coming out of the \$50,000,000 bond issue.

Now that the highway system is well under way, the people are beginning to see by actual facts and figures that the farmer is making more out of his crops and that his family has social advantages that make their lives more livable. City merchants are getting more country trade and city residents are getting fresher and cheaper produce. The automobilists are getting real pleasure from their machines and at a vast reduction in the expense of upkeep. Land values have gone up all along the line of improved highways; in certain instances known to the writer, properties in Rensselaer County have increased three and four times their value within the last three years. And so throughout the state.

Proposed Ocean-to-Ocean Highway Financed by the Automobile Industry

The construction of a stone road, extending across the continent from New York City to San Francisco, Cal., and financed by the automobile industry, is proposed by the Ocean-to-Ocean Highway Association, of Indianapolis, Ind., of which Carl G. Fisher and Jas. A. Allison form a temporary committee. Plans for raising the money required for the building of the road have been worked out and a sum amounting to several hundred thousand dollars has been subscribed.

The plans for financing and building the road were considered for some months by Carl G. Fisher and James A. Allison, President and Secretary, respectively, of the Prest-O-Lite Co., and of the Indianapolis Motor Speedway, and

was announced by them at a banquet to the automobile and other commercial interests of Indianapolis on Sept. 10 of this year.

By the plans proposed, a fund for building the road will be created by subscriptions from automobile and accessory manufacturers and dealers. Each subscription is to be of an amount equal to one per cent. of one year's gross earnings of the subscriber and is to be paid in annual installments in either three or five years as may be determined by a national committee elected by the subscribers. Assessments on signed agreements are to be made payable to trust companies to be named and required to furnish bonds, and no money is to be spent until at least \$10,000,000 has been guaranteed. If the plan fails, all money collected is to be returned to the subscribers with interest at three per cent. Additional funds are to be raised by membership fees of \$5, \$100 and \$1,000 received from motor car owners. Mr. Fisher and Mr. Allison intend to pay all promotion expenses until the success or failure of the plan is assured.

It is proposed to secure a fund of \$10,000,000, and to have all subscriptions made by Jan. 1, 1913. Approximately \$300,000 was subscribed at the banquet at which the plan was announced, and considerably more than that amount has been pledged since.

The fund secured is to be used solely for the purchase of crushed stone and other materials used for building the road, contracts for the construction being made with the states and counties through which the road passes. The work is to be performed in accordance with specifications prepared by the United States government, and inspected by government engineers. The promoters estimate that the fund of \$10,000,000 will provide over \$5,000 for each mile of road to be built and that the actual cost of material such as it is proposed to use represents only from 30 to 50 per cent. of the total cost of construction. From this they argue that, since the fund will be used only for material, the \$10,000,000 contributed will secure the construction of a road worth approximately \$25,000,000.

The selection of the exact route traversed by the road is to be left to the national committee, of which previous mention has been made. It is said that three suitable routes have been suggested and that on any one of these there is a total of 1,000 miles of macadam road needing but little improvement, which, with a considerable amount of paved city streets, will materially lessen the mileage to be built.

Although the possibility of securing financial aid from the federal government, from state governments or from organizations receiving assistance from public funds is realized by the promoters of the project, it is their belief that no such aid should be accepted, so that the avoidance of political entanglements may be insured. At the same time, the cooperation of private associations with purposes similar to that of the Ocean-to-Ocean Highway Association will be welcomed, it is announced. It is the intention of those interested in the project to have the building of the transcontinental road handled as a private enterprise by the leading men of the automobile industry in the same manner in which they conduct their other business affairs. Carried on in this way, they believe that the work can be completed by May 1, 1915, so that an automobile highway will be available for the use of motorists touring to the Panama Canal Exposition in San Francisco in May or June, 1915.

The Board of Public Works of Baltimore, Md., will open bids on November 21 at Baltimore for \$1,000,000 of state road bonds of \$1,000.

The Road Congress at Atlantic City

The first road congress held jointly by the American Association for Highway Improvement, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers, and designated as the American Road Congress, was held on Young's Million Dollar Pier at Atlantic City, N. J., on the six days from September 30 to October 5, inclusive. The first two days were designated as "Road Users' Days" and were under the direction of the American Automobile Association. The remaining four days were devoted to questions of legislation, administration, finance, economics, construction and maintenance, and were under the direction of the American Association for Highway Improvement. An exhibition of road building machinery and materials was held on the pier in conjunction with the congress, and included displays of various machines, tools and materials used in the building and maintaining of roads and streets.

The proceedings on Monday and Tuesday, "Road Users' Days," were devoted to addresses of welcome and to the consideration of the highway questions affecting the users of the roads, presented from their viewpoint. On Wednesday and Thursday attention was given to the general subject of road improvement, with especial reference to road work in other countries at the forenoon session on Wednesday, and to various matters pertaining to highway laws at the Legislative Section, as the afternoon session was designated. On Thursday, four phases of the general subject of highways were considered, the forenoon session embracing a section on finance and one on administration and the afternoon session a section on economics and a section on highway engineering education. The sessions of the last two days, Friday and Saturday, comprised the construction and maintenance section, which was divided into various subsections under which different branches of construction and maintenance were considered. Two sessions, one in the forenoon and one in the afternoon, were held on each of the six days except Friday and Saturday, three sessions—one in the evening, in addition to the two day sessions—being held on Friday and one session only on Saturday.

The length of the program makes it impossible to print in full all of the papers. In the following pages will be found a chronological account of the proceedings, in which brief reviews of most of the addresses and papers will be given. On other pages of this issue there are printed in full some of the papers, and others will be printed later.

Monday, September 30.

The first session of the congress was called to order by Logan Waller Page, President of the congress and of the American Association for Highway Improvement, at about 11 o'clock, Monday forenoon. After an invocation by Rev. Newton W. Cadwell, President Page, in the absence of Commissioner Riddle, who was to have welcomed the congress to Atlantic City, but who had been detained at City Hall, made a brief address, reviewing the history of the good roads movement, emphasizing the importance of road improvement, of wise highway laws, and making the present laws uniform. He also pointed out the scope of the subject of highway improvement, the need of providing for maintenance, the proportion of the mileage of improved roads to the total mileage of all roads, the waste of money through ignorance of proper methods and the lack of maintenance and the part the government has taken in road work, with especial reference to the highway measures introduced in the last Congress. President Page reviewed the bill

recently passed by Congress, and predicted that a majority of the next Congress would favor national aid. In conclusion, he sketched briefly the plans of the road congress and expressed the management's appreciation of the efforts of the various organizations and individuals cooperating in the meeting. He then introduced Robert P. Hooper, President of the American Automobile Association, as chairman during "Road Users' Days."

Chairman Hooper made a short introductory address, in which he spoke of the magnitude of the work of securing road improvement and emphasized the need for cooperation in it. Speaking for the American Automobile Association, he said that it wants to cooperate in every way possible and is doing so to the best of its ability. He then introduced Professor Charles Thaddeus Terry, Chairman of the A. A. A. Legislative Board.

Professor Terry, whose subject was "The Making of Automobile Law," held that the use of the roads by automobiles has come to be recognized as natural and well within the dedication of the highway, and that the tendency of legislatures to remove petty, harassing laws relating to automobilists is increasing. Since the earliest times of road building, he said, the building of good roads has gone hand in hand with the passing of good laws, and a nation's roads show the quality of that nation and are a measure of its strength and wisdom or its weakness and folly. Taking up specific provisions of automobile laws, Prof. Terry argued that if the automobilist has a natural right to use the highway he should not be made to pay exorbitantly for that use and the registration fee ought to be no more than sufficient to pay for the clerical work incident to registration. Touching upon the lack of uniformity in the laws of different states, he called attention to the annoyances to which an automobilist is subjected in entering one state from another and thereby coming under the jurisdiction of new laws with which he may or may not be familiar. Although much progress has been made in making the different state laws more uniform, he held that there is yet much to be done and that good roads will be useless without good laws governing their use.

At the close of Professor Terry's address, Chairman Hooper introduced N. P. Hull of the National Grange Legislative Committee, who spoke on the topic "The Farmer and His Road Using." Mr. Hull touched upon the economic and social advantages of good roads, calling attention to the economic advantage accruing from the reduction in cost of transporting farm produce and the consequent reduction in the cost of living, and of the social advantages to be gained by making communication between different farms, and between the farms and the centers of population, easier and pleasanter. The greatest economic question before the United States, he said, is, that out of every three wealth producers only one is upon the farm, producing food, and the movement from the farms to the cities is due to lack of facilities for social intercourse and the advantages afforded by city life. Mr. Hull also stated that although the American farmer is the greatest producer he has also been the greatest soil robber, and the reduction of the fertility of the soil could be largely prevented if there were good roads over which the waste from the cities might be brought back to the farms to enrich the land, during the season in which the farmer is not busy in caring for or marketing his produce. In closing, he urged that in the attempts to secure trunk lines, the great economic need of improving the tributary roads in farming communities be not forgotten.

At this point, Chairman Hooper introduced Commissioner William Riddle of Atlantic City, who had just arrived at the meeting after being delayed for some time at City Hall. Commissioner Riddle, who was the last speaker of the morning, extended the welcome of the city to the congress and spoke briefly on some of the phases of road improvement. The proper way in which to secure roads, he said, is to elect the right men. He also spoke briefly of the peculiar geographical and industrial characteristics of Atlantic City, advocated the employment of convict labor in road work and expressed his belief in national aid.

The afternoon session was called to order by President Hooper, who, in a brief speech, introduced Governor Woodrow Wilson of New Jersey, who made the first address of the afternoon.

At the commencement of his speech, Governor Wilson expressed his pleasure at being able to address the congress and said that he was very glad that it was not a political convention, but added: "I am afraid before you get through with the good roads question a good deal of politics will creep into it." From something he had heard of portions of certain bills, he said, he was afraid that politics had already crept in, but he thought that all would agree that it was very desirable that politics should be studiously excluded from it.

The good roads question, according to Governor Wilson, is one in which there is no difference which can discriminate between parties, and, in his opinion, is a question in which men of good judgment can hardly differ very radically. A nation is bound together by its means of communication, he said, and the question of highways is one which has interested him, particularly during recent years, because roads are one of the few great instrumentalities of public and communal life with which the government is of necessity connected. He showed that a road is of necessity a public instrumentality, and said, "It cannot from any point of view be regarded as a private instrumentality, and as I look forward to the future of the history of the United States I see that we must do what we have been very backward in doing as compared with other nations—we must more and more engage the government in providing the facilities of common life."

Taking up the subject of the old Roman roads, Governor Wilson said that the initial purpose of those highways was to enable Rome to throw her power rapidly in any direction by means of her armies. In his imagination, at any rate, Rome also prepared for her own destruction by those highways, he said, because she could not open them to her armies without also opening them to other people, and these could not come in contact with one another without forming an opinion about the Roman power, and without intermingling the influences of different nations, for the Roman roads did not stop at the nation's boundaries but extended beyond and threaded together the opinion of the world.

His interest in good roads, he said, is not merely an interest in the pleasure of automobile riding, nor in the very much more important matter of affording the farmers of the country and residents of villages means of access to neighboring markets; but it is also the interest in weaving as complicated and elaborate a net of neighborhood and state and national opinions together as it is possible to weave. "It is of the most fundamental importance that the United States should think in big pieces, should think together, should think ultimately as a whole," he said, and gave as his opinion that roads would tend to produce this result. No one argument ought to be omitted; every class has its arguments for good roads and putting them together they form an irresistible mass. Up to the present time, he said the United States has simply let the energies of its people drift. That has been the general attitude of the government, but it cannot be that attitude any longer.

It is the duty of the government, according to Governor Wilson, to undertake the doing of those things which will build up the prosperity of the country, and prosperity cannot rationally be increased without increasing the road facilities.

In closing Governor Wilson expressed his sympathy with the purposes of the congress and said he considered it an honor that the state of New Jersey should house the congress while it was "in consultation about what is, at the bottom, a great national interest."

At the close of Governor Wilson's address, Chairman Hooper introduced Powell Evans, President of the Automobile Club of Philadelphia, Pa., who spoke on "A National System in Marking the Roads."

Mr. Evans began by speaking of what had been accomplished in road marking in other countries, saying that the road system in the United States was so imperfectly developed and so rapidly changing that any such marking as adopted abroad would be very difficult here. At best, he said, we can hope only to establish such systems as will eventually merge into each other to form a national system. After reviewing the classification of French roads and stating that American state roads should be provided with milestones which should be uniform throughout the country, he described in detail a system of marking these milestones. The necessary signs on roads, he said, were: First, these direction and distance signs; second, single direction signs pointing the way to one place at the terminus or some other point on the road, and, third, one local speed limit sign and five danger signs, the latter to consist of sign boards bearing the following legends: "Blow Horn," "Railroad Crossing," "Steep Hill," "Sharp Curve," and "Run Slow." Symbolic signs like those employed by some automobile clubs might also be employed, he said. In the course of his address, Mr. Evans gave many details of construction, size, lettering, color and other points in connection with the signs.

The next speaker was H. L. Vail, of the Board of County Commissioners of Cuyahoga County, Ohio, whose topic was "Organized Effort versus Individual Effort." In speaking on the general topic of efforts for road improvement, Mr. Vail called attention to the fact that team work is as essential in the good roads movement as in football or other effort. He then mentioned Ohio's experience in attempting to secure the bond issue which was defeated at the recent election and argued as two reasons for its failure to pass, that it was too large and that there was no well developed plan for utilizing the money in the construction of a comprehensive system of roads. Mr. Vail dwelt at some length on this point, indicating the necessity of having a well-laid plan of operation perfected before attempting to secure money. He then passed to the subject of the roads of Cuyahoga County, speaking of what had been done there and how it had been accomplished. In closing he emphasized the necessity of providing for the future in building roads as well as in other construction.

Mr. Vail was followed by State Senator Walter E. Edge of New Jersey, whose topic was "Why New Jersey Opened Her Gates." Senator Edge outlined the conditions in New Jersey previous to the passage of the legislation removing some of the restrictions on automobilists from other states, and told of the final passage of that legislation. In speaking of the roads of New Jersey, he said that the state has now passed to the question of keeping the roads in repair when once built, and that preparations are now being made to turn all roads over to the supervision of the state instead of leaving them to be taken care of by the counties and municipalities.

The last speaker of the day was Jos. H. Weeks, Chairman of the Good Roads Committee of the Pennsylvania Motor Federation, whose subject was "How to Work for

State Aid." Mr. Weeks' address consisted principally of a review of highway legislation in Pennsylvania from 1903 to the present. After explaining in detail the provisions of the law of 1903, he said that after eight years under this law it was realized that the amount of state aid should be reduced and maintenance be provided for. The old plan, he said, allowed towns financially unable to take care of the roads to apply for state aid for construction, and under the old law roads were built at random without any attempt at the formation of a connected system. He then explained the Sproul bill under which the state now operates, and referred to the \$50,000,000 bond issue now pending. In closing he reviewed the work of the Pennsylvania Motor Federation in promoting the cause of highway improvement and emphasized the point made by one of the previous speakers relative to the necessity for providing a careful plan of operation before endeavoring to secure funds.

Tuesday, October 1.

The second session of the congress was called to order at 10:30 a. m. on Tuesday by George C. Diehl, Chairman of the Good Roads Board of the American Automobile Association, who occupied the chair in the absence of Chairman Hooper, who had been called out of town.

The first speaker of the session was J. C. Scates, Secretary of the Maine Automobile Association, whose topic was "The Maine Plan." In beginning his remarks, Mr. Scates said that ten years ago a congress of this kind would have been impossible, and that it was possible now because of the motor car, and that people owe the motorists a debt of gratitude for what they have done for the good roads propaganda. He believed that road development, he said, should be for commercial purposes rather than for pleasure. America was said to be the richest country in the world, he said, and should have the best roads, while, as a matter of fact, all other countries excel her. Continuing, he said "the national government has got to take up this question," and, according to Mr. Scates, as soon as the people who are interested get to work in their own congressional districts the sooner the government will get to work. But in the meantime the states must work out their own salvation.

He then explained in some detail the plan of road improvement adopted in Maine last winter. Saying that that state was the last of the eastern states to realize the importance of improved highways, he sketched former conditions, reviewed the laws passed by the last Legislature and outlined the plan adopted for raising funds for the work. In closing he expressed his belief that motorists are bearing more than their fair share of the burden of road improvement, but are willing to do so if the money is spent honestly and intelligently.

The next subject scheduled was that of "National Old Trails," which was to have been presented by Judge J. M. Lowe, President of the National Old Trails Road Association, and Mrs. Donald McLean, Honorary President-General of the Daughters of the American Revolution. Judge Lowe was unable to be present, but sent a paper which was read by Jesse Taylor, Secretary of the Ohio Good Roads Federation. Judge Lowe's paper dealt chiefly with a review of the history of various trails in the country, including such well known thoroughfares as Braddock's Road, the Cumberland Road, the Wilderness Road, the Boone Lick Road and the Santa Fe Trail. In the paper he also described the organization of various associations along the trail of the old roads for the purpose of restoring them and urged the desirability of such work. This paper was followed by a further presentation of the subject by Mrs. McLean, who said that she had always been interested in old trails and that although she was quite willing to leave the securing of the money for road improvement to men,

she, and the organization which she represented, wanted the expenditure directed rightly. She told of the work done by the women of Missouri in marking old trails in that state and urged that in the construction of roads the consideration of sentiment and patriotism be not overlooked.

In the absence of Judge H. C. Gilbert of Jackson County, Missouri, and Congressman G. W. Shackelford of Missouri, Chairman Diehl called upon James H. MacDonald of Connecticut. Commissioner MacDonald spoke very briefly on the progress made since the beginning of the good roads movement and said that he agreed with the speaker of the previous day who had urged that road building be removed from politics.

Chairman Diehl then called upon A. G. Batchelder, Chairman of the Executive Committee of the American Automobile Association, who spoke briefly, first calling attention to the difference in the attitude toward the automobilists which had come about of late and also to the automobilists' willingness to pay even an unconstitutional tax provided the money were expended wisely. He also told of the offer made by a group of automobile manufacturers to pay a certain proportion of the gross income of their business in 1913-4-5 for the construction of an ocean to ocean road. After enlarging somewhat upon the transcontinental road idea, he spoke briefly of convict labor and other matters.

At the close of Mr. Batchelder's address, the meeting was opened for general discussion, and City Engineer Morris R. Sherrerd of Newark, N. J., presented a resolution, requesting the president of the congress to appoint a committee of five to suggest some form of legislation for the organization and control of the use of roads by automobile trucks and traction engines. He spoke at some length on the resolution, advancing as one of the arguments in favor of it the belief that the passage of some such legislation is due to the manufacturers of the class of vehicles affected. Continuing, he suggested that it might some time be necessary to construct two classes of roads to accommodate the two classes of vehicles.

Frederick F. Smith, President of the New Jersey Automobile and Good Roads Association, spoke briefly, supplementing what had been said on the subject of road marking on the previous day. The system advised by Mr. Evans has advantages, he said, but would be very expensive, and suggested as a substitute the marking of telephone and telegraph poles by means of painted bands which, by their color and variations as to number, size, etc., should give information in regard to directions and distances.

After some further general discussion by W. P. Blair, Secretary of the National Paving Brick Manufacturers' Association, and others, the meeting was adjourned until afternoon.

The afternoon session on Tuesday was called to order at 2:30 p. m. by Chairman Diehl, who introduced G. Grosvenor Dawe, Chief of the Editorial Division of the National Chamber of Commerce, as the first speaker. Mr. Dawe, whose subject was "Business Organizations as Good Roads Accelerators," said that within the past fifteen years chambers of commerce and similar bodies have multiplied by the thousands, while, in the same time, road improvement has come to the front. Both developments have covered practically the same period of time, and the commercial bodies in all towns have helped the cause of good roads. Except for the promotion of a few scenic highways, he said, the efforts of commercial bodies have been along practical lines. Mr. Dawe gave many examples from widely separated parts of the country showing what had been accomplished by various chambers of commerce and like organizations, touching upon educational campaigns, efforts to secure legislation, the raising of funds for the construction of roads, the actual work of construction and maintenance by means of "good roads days" on which citizens

got out on the roads and actually worked, the holding of good roads meetings and other similar phases of activity.

The next topic taken up was the general one scheduled as "How to Encourage the 'See America First' Idea." This subject, according to the program, was to have been presented by Preston Belvin, President of the Virginia State Automobile Association; Jos. Hyde Pratt, President of the Southern Appalachian Good Roads Association; S. S. Ballard, Secretary of the Automobile Club of Vermont; D. M. Potter, Vice President of the Ocean-to-Ocean Highway Association, and Frank D. Lyon, Secretary of the New York State Automobile Association. All of these speakers were present and spoke as scheduled except Mr. Ballard. In addition to those whose names appeared on the program, Capt. H. Z. Osborne, Secretary of the Los Angeles (Cal.) Chamber of Commerce, also spoke.

The first speaker on this topic was Mr. Belvin, who devoted his remarks to Virginia. After speaking of the scenic beauties of that state and of the hospitality of her people, he took up the road work being done there, sketching the situation in general and describing briefly some of the individual roads which have been built. He also devoted some attention to a historical review of road building in Virginia and described some historic roads. In closing he emphasized the appropriateness of building a national highway linking Washington and Richmond as a memorial to Abraham Lincoln.

Dr. Pratt followed Mr. Belvin, beginning his remarks with the general subject of "See America First." Referring to the necessity for such a campaign, he said that the answer could be found in a few words and that these related to roads. In Europe, he said, most points of interest can be reached by first-class highways and when we have the same condition in this country we will be able to keep many of the tourists at home. After giving figures showing the amount of money spent abroad by American tourists each year, Dr. Pratt described the Southern Appalachian region, saying that probably no section of country in the eastern part of the United States has more rugged scenery than has this section. It also has a greater variety of flora and fauna than is found in any other section of country. It is not better known, according to Dr. Pratt, because of the lack of means of transportation. While there are several railroads that penetrate the region, highways are greatly needed, and plans for remedying this have already been worked out, the Southern Appalachian Good Roads Association having been formed solely for this purpose. It was believed, he said, that a road through this country would best serve the purpose and, accordingly, the "Crest of the Blue Ridge" Highway was planned. This road, according to Dr. Pratt, will not only form a remarkably beautiful scenic road, but a commercial road as well. He described the road in detail and told of the progress which had been made in its construction. The legislature of 1911, he said, chartered a company to build the road, money has been raised by private subscription and portions of the road have already been completed. A part of it will necessarily be a toll road, he said, for some time to come.

Mr. Potter followed Dr. Pratt, speaking principally of the advantages of the proposed transcontinental road which, as planned by the Ocean-to-Ocean Highway Association, will extend from New York to Los Angeles, passing through fifteen states. Mr. Potter contended that this road should be built by the government and that it be the first to be so built. Other points touched upon by Mr. Potter were the necessity for building roads in this country in order to induce the tourist to spend his time here instead of abroad, the cost of hauling in foreign countries as compared with the cost in the United States and the desirability of national aid. Our prosperity, he said, depends on national highways. Only one-half of the available land in the country,

he said, is under cultivation because of the length of the average haul. The production will never be what it might, he claimed, until we have good roads, and for this reason alone the construction of such roads is a good business proposition. Three roads across the country from east to west and three from north to south, he thought to be the number of main roads needed. In closing he maintained that if good roads are not built here, American money will go to Europe for the maintenance of its roads.

Capt. Osborne of the Los Angeles Chamber of Commerce was the next speaker. At the beginning of his address, he emphasized the pleasure and practical benefit of the "See America First" idea. People go to Europe, he held, because over there they see interesting things and at the same time have all the comforts of an old, established civilization. In this country, many improvements have been made for the comfort of travelers, he said, and compared a journey across the continent now with a similar trip in the early days. The automobile has much to its credit, according to Capt. Osborne, in bringing about road improvement. He then described the work which has been done in California, with particular reference to that in Los Angeles County and to the work which has been done, and which it is planned to do, under the \$18,000,000 state bond issue. In referring to the work in Los Angeles County, he said that the improved roads there had drawn many winter tourists to the section.

The last speaker on this topic was Frank D. Lyon, who devoted the first part of his address to a description of the color marking scheme adopted on certain through roads in New York State. This has been previously described in these columns and will not be repeated here. (See "To Mark Automobile Roads in Color," "Good Roads," Sept. 21, 1912, p. 125.) Mr. Lyon then said, "I believe in federal aid," but went on to explain that he did not agree with some of the ideas advocated for securing and applying such aid. We should, he said, devise some plan by which we can secure federal aid in the least possible time. He did not believe in the wholesale construction of roads by federal aid, but outlined a plan which he felt would secure satisfactory results. By this plan, he said, the federal government should establish a national department of highways, independent of all other branches of the government. Agents of this department should go out into all the states and study the conditions of each particular locality. Digressing at this point from the subject of federal aid, he explained the provisions in New York by which a large proportion of the total mileage of the state is left to be cared for by the towns. He explained this work in some detail, and stated that by the expenditure of a very small amount of money per mile per year, much has been accomplished in most of the towns in the state. A similar plan, he said, is applicable to work under federal aid. The officials of the federal department, he said, should go into each state and encourage the establishment of state departments, which, having been established, should indicate main highways in that state to be taken over by the federal government as the federal highways. This work in the various states, being under the supervision of one central authority, could be made coordinate and a comprehensive national system secured. The government should then grant a certain specified amount per mile per year for the roads designated as federal roads, which money might be applied by the state either for improvement or maintenance. This plan, he said, would prevent jealousy among the states, as in those states in which roads included in the federal highways had already been built the money could be used for maintenance. In some states, he said, the necessary work on the roads designated as federal highways could be accomplished for a very small amount and the balance utilized for some other purpose.

Wednesday, October 2.

The first session of the four days devoted to questions of legislation, administration, finance, economics, construction and maintenance, and held under the direction of the American Association for Highway Improvement, was called to order Wednesday morning by President Logan Waller Page of the American Association for Highway Improvement. After announcing that President Taft, who had been scheduled to address the congress, had been forbidden by his physician to speak and, therefore, could not be present, and that Secretary of Agriculture Wilson, who had been designated to act as President Taft's representative in case he should be unable to attend, was also unable to be present, President Page introduced M. de Pulligny, Engineer in Chief of Roads and Bridges of France, who presented a paper entitled "The Road System of France." In his paper (which is printed in full in another part of this issue) M. de Pulligny explained in detail the classification of French roads and the various laws under which they are administered.

The next speaker was J. E. Caron, Minister of Agriculture and Roads of the Province of Quebec, Canada. The Province of Quebec, Mr. Caron said, commenced the betterment of its roads in 1907, when a campaign of instruction was launched. The government offered bonuses to municipalities to build gravel or macadam roads, and some few took advantage of it, he said. In 1909, the bonuses were increased, and over 200 municipalities availed themselves of the aid, while in 1911 the number was increased to 343. In 1912 a further increase in the amount available to the provincial government was made, which will be distributed among the municipalities. Last year, he said, the government went further and provided most of the funds for the construction of the Canadian portion of the Quebec-Miami Highway, paying all but \$1,000 per mile, which was paid by the municipalities. Except for inclement weather, he said, two-thirds of this road would now be completed, and as it is, it will be finished by next June. Some weeks ago, it was also decided, he said, to construct a road between Montreal and Quebec next year. Referring to the methods of construction used, he said that on the Canadian portion of the Quebec-Miami road, water bound macadam had been used, but that there would be sections of cement concrete and of bituminous macadam, which would be put down for experimental purposes.

W. A. McLean, Provincial Engineer of Highways of Ontario, Canada, followed Mr. Caron, speaking on "Road Improvement in Canada." Mr. McLean laid especial emphasis on the necessity of providing for the organization of an administrative force, saying that once that was properly provided for other things would follow naturally. He then explained the form of government and compared it with that of the United States, after which he took up the several Canadian provinces, one by one, and described what had been done by each in road improvement. In closing, he said that in Canada as a whole the expenditure for roads this year would amount to about \$10,000,000, which was regarded as only a beginning.

The next speaker was W. W. Finley, President of the Southern Railway Co., who spoke on "Good Roads and The Cost of Living." One reason for the high cost of living, according to Mr. Finley, is that the demand for produce exceeds the production. To increase production, the yield per acre must be increased and a greater acreage must be put under cultivation. In order to accomplish the latter, he said, the country highways must be improved. He enlarged upon this point, explaining how roads are needed for all kinds of general farming, how road improvement and increased agricultural production are of interest to everyone, and how the railroads would benefit by it. For this sound business reason, he said, many railroads are

doing considerable work to further road improvement. Railroads, Mr. Finley held, can no more replace roads as feeders to the principal lines of transportation than roads can replace railroads for long distance hauling; the two supplement each other, and this fact ought not to be overlooked in planning road improvement. The county system he believed to be the most effective for benefiting the largest number of road users, and outlined a logical planning of the county system, pointing out the advantages of well-laid plans, effective supervision and other details. If all work which has been done had been done intelligently, he said, the roads would now be good, and for that reason, he believed that each county should put its work under the care of a competent highway engineer. In closing, Mr. Finley reviewed methods of raising money, expressing his preference for bond issues with proper provisions for the repayment of the principal.

The next speaker was Henry W. Anderson, of Richmond, Va., who spoke on "Needed Reforms in Road Legislation." At the beginning, Mr. Anderson pointed out that the conditions in different states are so varied that only general conclusions can be drawn, and that the fault at present is too much, rather than too little, legislation. Care should be taken not to make too many laws but to simplify the present laws, which are now so confusing that there is difficulty in administering them. Roads cannot be built by legislation, he said, and road laws should be designed to cover two points—getting the money and expending it properly. In addition, laws must be drawn with present conditions in mind and must not be behind or ahead of public sentiment. The good roads question, he said, is not a mere local question; it has become a state question and even a national one. He then reviewed the changes in securing money or labor for the improvement of roads, saying that state aid is an advance from the scheme of working out road taxes and that it is now recognized that the problem is one to be solved by the state and the burden of cost distributed in proportion to the benefits conferred. He also outlined a plan for apportioning the cost by dividing the roads into state roads, county roads and district roads, and adjusting the taxes in each of these divisions on an equitable basis.

Mr. Anderson also emphasized the importance of efficient administration, which, he held, can be secured by the concentration of authority and responsibility. For this reason, he argued, the state should control the state roads, the county the county roads and the district the district roads. It is impossible to have efficient administration, he said, so long as the initiative for the improvement of main roads lies with local units, and the logical system of road legislation for the present is one providing for a system by which roads will be divided into three classes, as outlined. England, he said, had good roads only when the government took control of them, and, in like manner, good roads will never be secured in this country until the states, at least, take charge.

Mr. Anderson then took up the subject of federal aid, expressing his belief in its constitutionality but saying that he would not go into constitutional arguments; if the people want federal aid they will get it. Heretofore, he said, roads have been looked upon as purely local advantages, just as railroads were once regarded as state institutions. As the railroads developed, however, the national government was obliged to step in through an interstate commerce commission. The highway problem, he held, is essentially the same. Automobile traffic is interstate traffic, so that the federal government is competent to deal with it, and he held that the government should build and maintain such roads and regulate their use.

Maintenance, Mr. Anderson said, has not received enough attention heretofore. No county, he held, should be allowed to issue bonds without making proper provision for main-

taining the roads to be built with the proceeds, and the same restrictions should be applied to state work. In closing, he spoke briefly on convict labor, saying that in all states legislation should provide for the use of convicts on road work—state prisoners to be employed on state roads and county prisoners on county roads.

At this point, President Page announced the appointment of the committee on resolutions as follows: F. G. Norris, Arizona; W. S. Keller, Alabama; A. G. Spalding, California; J. H. MacDonald, Connecticut; Prevost Hubbard, District of Columbia; L. D. Smoot, Florida; David Beecroft, Illinois; C. A. Kenyon, Indiana; Gervais Lombard, Louisiana; L. H. Nelson, Maine; H. G. Shirley, Maryland; A. W. Dean, Massachusetts; G. W. Cooley, Minnesota; H. C. Gilbert, Missouri; F. E. Dunbar, Michigan; F. F. Smith, New Jersey; C. G. Reel, New York; J. H. Pratt, North Carolina; W. P. Cantwell, South Carolina; Geo. McBride, Nebraska; S. D. Foster, Pennsylvania; C. E. Gordon, Philippine Islands; M. B. Beers, Utah; J. B. Wilbur, Vermont; Preston Belvin, Virginia; J. A. Sheppard, West Virginia, and F. G. Simmons, Wisconsin.

The last speaker of the morning was L. V. Boughner, Chairman of the Highway Improvement Committee of the Civic and Commerce Association of Minneapolis, Minn. Mr. Boughner gave a detailed account of the publicity work incident to a campaign to secure funds for road improvement in Minneapolis and Hennepin County. He described an elaborate system of inquiries directed to farmers and property owners, giving some of the results of the canvass thus made and explaining other methods employed to ascertain the state of public opinion regarding the proposed work and to arouse public sentiment for its prosecution.

The afternoon session on Wednesday, designated as the Legislative Section, under the auspices of the American Bar Association, was called to order by President Page, who introduced Col. Wm. D. Sohler, Chairman of the Massachusetts State Highway Commission, as chairman of the section. Col. Sohler made a brief introductory address, in which he took up the question of legislation, with especial reference to traffic regulation. Many of the present problems in the highway question were old, he said, when this country was founded. He believed, he said, that it would be well for the bar associations of various states to recommend general uniform laws. Until recently, he said, we thought that we imbibed with our mothers' milk the ability to build roads and every citizen feels that he has a thorough knowledge of the subject. But what we need primarily, according to Col. Sohler, are laws that will secure the spending of the money for road improvement by men who know something about building roads, for road building is a business. He also called attention to the need for laws providing that men who have been trained in state highway departments be kept in the same work, and emphasized the necessity for paying sufficiently high salaries to secure expert services. In this connection, he pointed out that in some state highway departments the pay is so low that the engineers are induced to leave by offers of higher salaries elsewhere. In the United States, according to Col. Sohler, the tendency is to try to go too fast, and the man does not live who can enter upon new work and spend a large sum economically.

Taking up the matter of engineering expenses in road construction, Col. Sohler pointed out the necessity of spending enough to insure the preparation of complete and adequate plans before undertaking the actual construction. Col. Sohler also touched upon the securing of material before beginning work, and cited examples in which failure to do this had resulted in the ultimate payment of excessive sums to private interests which had bought up available supplies of local material. If skilled supervision is to be had, in road work, Col. Sohler pointed out, it will be necessary to have a sufficient road mileage in each unit to make it econ-

omical to pay the salaries required to secure competent men. He also took up the question of borrowing money on long time bonds, and called attention to the necessity of providing for such maintenance that the road at the time of the maturity of the bonds will be worth what it cost. In this connection, he cited the example of railroads which lay aside from 10 to 15 per cent. for maintenance and similar charges, and called attention to the failure of state highway departments to do the same, with the consequent necessity for spending large sums for putting roads back into shape when they might have been kept in condition by proper maintenance. A road is a piece of property that, while an asset, is at the same time always a liability, and must be kept up, he said. In closing, Col. Sohler predicted the coming of increased long distance transportation by automobile, and cited recent traffic figures in Massachusetts to show the tendency in that direction.

State Highway Commissioner MacDonald of Connecticut was the next speaker, his subject being "The Evolution of State Highway Departments." After speaking of the excellence of French roads and complimenting Col. Sohler on his introductory address, Commissioner MacDonald said that it was fitting that the congress was being held in New Jersey, the mother of the good roads movement. He also said that he wished that conditions were such that people could be brought into closer personal contact with the question of road improvement, and that the value of conventions lay in the personal contact with men who have done work. Disinterested people, he held, should discuss the subject, for the American people are conservative and they want to know what interests, if any, are represented.

It is nonsense, said Commissioner MacDonald, to talk about refinement in road building. If ever the United States is to have a good system of roads, that system will have to grow from small beginnings. Improved roads he considered not expenditures but investments, and said that he had seen the value of land in Connecticut increased from \$7 an acre to \$100 an acre by the improvement of a road. In such cases, he said, it would take a long time for the upkeep of the road to use up the sum equal to the increase in value brought about by its improvement. The refinement of road building, he said, is a matter of many men of many minds, and it must not be lost sight of that a "good" road is one that can take care of the traffic it is called upon to bear. Commissioner MacDonald then gave a considerable amount of statistical information on road construction in the country during the past year, and a list of the state aid states, arranged according to the dates on which they adopted the state aid plan. In closing, he said that there is no question but that the movement for improved roads has come to stay, if it can be removed from local prejudice and from politics. If, however, money is squandered, he said, or if certain interests insist on special classes of pavements, the people will be quick to take back what they have given.

At the close of Commissioner MacDonald's address, Chairman Sohler introduced Clarence A. Kenyon, President of the Indiana Good Roads Association, who was scheduled to open the general discussion. Mr. Kenyon began his remarks by paying a high tribute to Commissioner MacDonald and his work in Connecticut. He then took up the situation in Indiana, reviewing highway legislation in that state and severely criticizing the present method of working out road taxes. The trouble with Americans, he said, is that they do not enforce the laws they have made. In closing, he pointed out the fallacy of the argument of "old civilization," so often advanced to explain the superiority of foreign roads. The best French roads have been built within the past hundred years, and the excellent construction so often found in foreign countries, and attributed to the fact that the

countries are old, is in no way a result of that age. In this country, he said, we have the same engineering knowledge and the same opportunities that they have abroad; the only difference is that the people of foreign countries will do the work and we will not.

The last speaker of the day was Chas. Dew, of Birmingham, Ala., who spoke at some length on the elimination of politics from road work, and the necessity for competent engineering. Mr. Dew held that the correct solution of the road question depends upon the passage of wise laws and that the laws most necessary are state laws, since these directly affect the mass of the people.

Thursday, October 3.

The session on Thursday forenoon was divided into two sections, designated as the Finance Section and the Administrative Section, held in the order named. The session was called to order shortly after 10 o'clock by President Page, who introduced Lee McClung, Treasurer of the United States, as chairman of the Finance Section.

The first address was made by Mr. McClung, his subject being "Bond Issues for Road Improvement." Bond issues for this purpose, according to Mr. McClung, are justifiable when they are carefully planned. Before issuing bonds, he held, an investigation should be made by an engineer, who should take into account traffic and other features having direct bearing on the question, and funds secured from bond issues should be expended under skilled supervision. Mr. McClung called attention to the fact that it is not wise to issue bonds to run for periods longer than the life of the improvement, unless provision is made for maintenance whereby the road can be kept in such condition that at the maturity of the bonds it will be worth what it cost. He then cited examples of bond issues in various states and touched upon some of the advantages of this means of raising money for improvement work. Two of these to which he called special attention are that the community is enabled to realize an immediate benefit and that the unit cost of construction is lowered by the greater amount of work that can be undertaken. Mr. McClung also took up the matter of sinking funds and explained detailed plans for the payment of interest and principal.

Henry G. Shirley, Chief Engineer of the Maryland State Roads Commission, followed Mr. McClung, and presented a paper entitled "Road Accounting." Many state highway departments, Mr. Shirley said, have overlooked the importance of providing proper accounting systems. In Maryland, the old system was found inadequate, and in June, 1912, a committee was appointed to revise the system. Expert accountants were employed to make a thorough investigation, and after examining other departments a system was devised and adopted. The remainder of Mr. Shirley's paper was devoted to a detailed explanation of this system as applied in the work of the Maryland State Highway Department.

The next address was made by Jacob S. Coxey, of Massillon, Ohio, who spoke on the history of the good roads movement in that state and upon his present plan for a \$100,000,000 bond issue. What is termed government "aid" should be called government "duty," according to Mr. Coxey. After referring to the long time he had been interested in the good roads movement and explaining that his interest was only that of a citizen, he sketched the events leading up to the formation of the army of unemployed which he led in the march to Washington and told of his connection with public affairs in Ohio, with especial reference to his advocacy of good roads, from the time of his candidacy for governor eighteen years ago to the present. The Ohio bond issue, he said, was voted down because the people will not vote for interest bearing bonds. He then explained his plan for securing a bond issue not

to exceed \$100,000,000. This plan is explained on another page of this issue.

At the close of Mr. Coxey's address, Mr. McClung introduced Col. E. M. Bigelow, State Highway Commissioner of Pennsylvania, as chairman of the Administrative Section. Col. Bigelow spoke briefly of highway affairs in Pennsylvania and of what has been accomplished recently in that state.

In beginning his remarks, Col. Bigelow stated that about a year ago it was decided to make a change in road conditions in Pennsylvania, and then told of the passage of the Sproul bill, which provided that in June, 1912, the state should take over 8,000 miles of the 90,000 in the state. Up to September, he said, the State Highway Department has put in good condition 4,000 miles, and let contracts, which are now under way, for more than \$3,000,000 worth of work. In the past year, he said, the department has finished the surveying of the 8,000 miles of road, and next year will be able to begin construction. He then spoke of the work done in Allegheny County, giving figures showing the mileage of roads improved and the amounts expended. In that county, he said, the increased valuation has paid the cost of the road work, and it has never been found necessary to increase the taxes.

S. Percy Hooker, State Superintendent of Highways of New Hampshire, who followed Col. Bigelow, read a paper entitled "Administrative Systems of Road Maintenance." The use of the term "permanent improvement," he said, has been unfortunate since there is really no such thing as permanent improvement, the term having been used as a polite fiction to get people interested in improvement work. He then took up the subject of the cost of engineering on road work, holding that this cost is entirely different from the corresponding cost on other construction work because of the fact that roads are scattered all over the country and many engineers are required, with the result that the engineering charges have been higher than on other work, and some criticism has been caused. Taking up the subject of maintenance, he said that it is necessary to keep maintenance and construction separate and that different kinds of men are needed. Patrolmen merely keep the road in order, he said, and perhaps too much reliance has been placed upon them in the past. A good deal depends upon the ability of such a man and adequate inspection of patrol work must be provided. The inspector, he said, must be a man with gifts different from those of a highway engineer. He also held that the inspector should not employ an automobile or a motorcycle, since he would go too fast and thereby miss many things which he ought to see; he should use a horse. How much road a man should have under his charge, he said, is a question, his own opinion being that probably 100 miles under the care of 10 or 12 patrolmen is about right. The inspector should give all of his orders in writing, he held, so that the state office can have copies. Mr. Hooker expressed his belief, also, that the patrol system can not solve the problem, saying that there is needed a crew, consisting of from 12 to 15 men, 3 teams, a roller and oiling equipment, which should start out early in the spring and do the extraordinary repair work, after which the road should be turned over to the patrolmen. The inspectors, he said, should be under the supervision of a chief inspector, who should have an automobile, as he would have to cover a great deal of ground. Mr. Hooker also gave figures as to the cost of maintenance work and exhibited a diagram showing the organization of the maintenance department.

At the close of Mr. Hooker's paper, the question of maintenance was discussed by Col. Bigelow, Mr. Diehl, Mr. Hooker and others, after which the meeting was adjourned until afternoon.

The afternoon session on Thursday was divided into two sessions, the first on economics and the second on highway engineering education. The meeting was called to order at about half-past two by President Page, who introduced Dr. Jos. Hyde Pratt, State Geologist of North Carolina, as chairman of the Economics Section.

The first subject taken up was "Convict Labor in Road Improvement," which was discussed by Dr. Pratt and Professor E. Stagg Whitin, General Secretary of the National Committee on Prison Labor, Dr. Pratt speaking first.

Convict labor, Dr. Pratt said, used to be regarded as so much collateral upon which the maximum profit should be made. That view is now disappearing, he said, and we are trying to turn out the convict a better man than when he went in, and to that end have made a study of the various kinds of work to which the convict can be put and of the effects of that work upon both the convict and the state. Dr. Pratt believes that the convict should be punished and that the fact that he is being punished should be emphasized. At the same time, the punishment having been inflicted the debt of the prisoner is paid in full, and it should be borne in mind that he is again to become an associate of men. For this reason, Dr. Pratt said, he hates to hear the word ex-convict or jail bird applied. As states and counties are put to great expense in apprehending, convicting and punishing convicts, it is only right, according to Dr. Pratt, that the convict should repay at least a part of the cost, and he believes that convicts should be employed in some labor. In many places, he said, convicts do absolutely nothing and in others very little. It is undoubtedly true that the condition of a convict is very much improved if he is kept employed, and as this belief is becoming more general, he said, efforts are being made to employ the convict at work of some kind. In addition to the benefit to the convict from such labor, society in general is also benefited. Speaking of the practice in vogue at present, by which convicts are leased to manufacturers and mine operators or employed by the state itself in various work, Dr. Pratt said that up to ten or fifteen years ago these were the general methods employed. Public opinion, however, has crystallized against the leasing system and at present most states are considering its abolishment, believing that it is not to the best interests of the convict or of society at large. In this connection, Dr. Pratt cited examples of the employment of convicts in coal mines in various states, saying that in all of these the matter of abolishing the system is being taken up.

One form of work which convicts can do, that will be to the best interests of both the convicts and society in general, said Dr. Pratt, is the construction and maintenance of public roads. In the first place, a road is a public necessity and a convict working upon it is conferring a direct benefit such as he could pay in no other way. Railroads have been built by convict labor in the past, he said, but in such work the country as a whole is not benefited. In road building, however, it is, and, moreover, the convicts are not brought into competition with free labor, as they are in manufacturing industries. The argument that such labor would compete with free labor has been made, according to Dr. Pratt, but the fact is that trouble is had in getting free labor.

The economics of the convict labor question have been raised in many of the states, according to Dr. Pratt, but especially in those where such labor has not been employed. If it is necessary to guard convicts, he said, their work should be concentrated, as in grading, but he believes that under certain conditions it is possible to work convicts without guards on the public roads of practically all the states. The honor system is much used in the West, where excellent results have been secured by it, and there is hardly a jail in the country in which

the honor system—that is, the employment of "trusties"—is not employed to some extent. The use of this system reduces the cost of guarding and permits the scattering of gangs over the work. As regards the matter of the effect, upon prisoners and the general public, of employing the convict in view of the public, Dr. Pratt held that little harm could result and suggested that to minimize any such possibility, stripes be discarded as has been done in many cases. Certain convicts who can not be used on the roads, he said, can be employed in breaking stones in stockades.

Dr. Pratt then took up the effect upon the character, morals and health of convicts, saying that he had been told, in some cases, that it was impossible to place convicts where they would be healthier and their morals better than in prison. He had sent out inquiries, he said, as to these three points, and only 4 of 190 replies were to the effect that the health was in any way impaired by road work or that the moral condition was not as good or better than when in prison or that the convict could be better employed than on road work. The cost of convict labor, he said, averages from 35 cts. to \$1.25 per day per man for guarding, maintenance, etc., and where the cost is high it will be found that the cost of day labor is correspondingly high. Reports received by Dr. Pratt indicate also that convict labor can be used as efficiently as free labor. The convict, he said, should be allowed a certain amount per day for his labor, this amount to accumulate and be paid to him upon his discharge or paid to his family. He also recommended that the convict's sentence be commuted in proportion to the time spent by him on road work.

At the close of Dr. Pratt's address, he introduced Prof. Whitin, who spoke briefly on the same subject. Not all convicts, said Prof. Whitin, can be used on the roads. A careful study of the whole question must be made along lines of scientific investigation, taking the question as a whole—that is, what to do with the convicts that can be used on the roads and what to do with those that cannot. Another point made by Prof. Whitin was that there must be better cooperation between highway and penal authorities. In each state, he said, the question must be studied in its entirety by road men, automobilists and highway officials. He suggested that each of those present ascertain what is being done in his own state—the opposition to convict labor being largely because people are not educated up to the idea and because strong manufacturing interests are also opposing it.

At the close of Prof. Whitin's remarks, Dr. Pratt introduced P. V. De Graw, Fourth Assistant Postmaster-General of the United States, who was scheduled to speak on Wednesday forenoon, but had been unable to be present at that session. Mr. De Graw, speaking on the subject "Good Roads, Rural Delivery and Parcels Post," stated that he was not posted on the economic phase of road building, but wanted to leave a thought with the congress in regard to road work from the standpoint of the rural letter carriers which he represented. The Department of Agriculture and the Post Office Department, he said, are closely allied in road improvement work; naturally so, because letter carriers have to have good roads. He requested that each one interested in road improvement keep the subject in mind wherever he was, make note of each piece of bad road, report it to the highway authorities and if no action were taken report it to the rural letter carrier, who, in turn, would report it to his postmaster, from whom it would be referred to Mr. De Graw. These complaints as they come in, said Mr. De Graw, are referred to Director Page of the United States Office of Public Roads, who has the matter looked up. If the road is on a rural free delivery route, the postmaster under whose jurisdiction this matter falls is required to demand a report from the carrier covering it, and if this shows that the road is not

passable, the matter is reported to headquarters. The postmaster is then directed to take the matter up with the highway authorities, and, if nothing is done, headquarters takes it up with the highway authorities. If there is still no result, that section of the road is eliminated from the delivery route. This work, according to Mr. De Graw, has done a great deal to crystallize public sentiment for better roads.

The next speaker was Jesse Taylor, Secretary of the Ohio Good Roads Federation, whose topic was "The Benefits and Burdens of Road Improvement." Mr. Taylor held that the benefits of good roads are found in the enhancement of farm values and property values in general, and that one of the greatest burdens of road improvement in this country is lack of competent engineers. He also stated his belief that in spite of the fact that there is still much to be learned regarding methods of road construction it is no longer necessary to look to Europe for information. He then called attention to the increase in interstate traffic and cited that as an argument for federal aid.

Mr. Taylor was followed by Howard D. Hadley, President of the Quebec-Miami International Highway Association, who gave an account of the activities of that association and described the work done on the Quebec-Miami Road. He also predicted that the entire route, having a length of 2,500 miles, would be completed within the next two or three years.

At the close of Mr. Hadley's remarks, Dr. Pratt introduced Professor F. P. McKibben, of Lehigh University, as chairman of the Highway Engineering Education Section, held under the auspices of the Society for the Promotion of Engineering Education. In introducing the subject of highway engineering education, Prof. McKibben stated that there are not enough highway engineers at present. Steel companies, railroads and other industrial enterprises are willing to pay higher salaries than are highway authorities, he said, and in order to attract the kind of men wanted, the salaries paid to men in this branch of engineering will have to be materially increased. He then introduced Professor Arthur H. Blanchard, of Columbia University, who presented a paper entitled "Highway Engineering Education." Professor Blanchard's paper will be printed in full in a later issue of "Good Roads."

In introducing the next speaker, Professor McKibben stated that from 25 to 80 per cent. of the engineering students in this country work during their vacations, and suggested the desirability of an arrangement enabling those men desiring to enter the field of highway engineering after graduation to follow that line of work during vacations. He then introduced S. A. Stephenson, Jr., Instructor in Mathematics and Graphics at Rutgers College.

Mr. Stephenson presented a paper entitled "The Essential Requisites in the Making of Highway Engineers," in which he described the course in highway engineering at Rutgers College, which, he said, is practically new and still in a process of evolution. He also outlined briefly a model course, listing some of the essential subjects. Among those which he emphasized as especially important were manual training and training in English.

Professor E. B. McCormick of the Kansas State Agricultural and Mechanical College was the next speaker. The work of the highway engineer, he said, is highly specialized, but as regards fundamentals is practically the same as that of the civil engineer. There seems to be, he said, a demand for men to take charge of work immediately upon graduation, but he did not believe that the function of the technical school is to meet such a demand. For instruction in branches of especial importance to the student who is to engage in highway work, Professor McCormick favored options replacing certain regular studies during the senior year. By cooperation between engineering schools

and state and federal departments, he believed a limited number of men could be put in minor places and allowed to work up to responsible positions. In closing, he said that the technical school had no more right to turn out a specialist in highway engineering from an undergraduate course in civil engineering than to produce a refrigerating expert from a similar course in mechanical engineering.

The last speaker of the afternoon was Professor Hugh Miller of the Clarkson School of Technology, who spoke on the topic "Highway Engineering in a General Course of Civil Engineering." Teachers, he said, cannot hope to teach highway engineering but they can give instruction in the scientific subjects needed as a foundation for that work. He then outlined a course, specifying the particular subjects to be included and the number of hours allotted to each. There is no question, he said, but that the best training can be given in a postgraduate course, but all students cannot afford the time for this, and so it is necessary that general courses be made in some way to supply at least a part of the needed training. He did not advocate specialization in undergraduate courses, but felt that those in charge should realize the importance of the subject of highway engineering and change the methods of instruction to meet the demands as nearly as possible.

At the close of Professor Miller's address, the committee on resolutions presented a report embodying a set of resolutions. The report was adopted as read and was as follows:

Report of Committee on Resolutions

1. Whereas, it has been the policy of our central government to aid in the development of our natural resources; and whereas, one of the main factors in the development of these resources is the public roads; and whereas, the money appropriated and expended by the various states for this purpose is in many cases largely wasted on account of the lack of knowledge of those entrusted with its expenditure in regard to the location, construction and maintenance of roads; and whereas, if the federal government were in a position to give to the several states the necessary advice and instruction regarding these road problems large sums could be saved to the states; Be it Resolved, that this Congress herewith commends the action of the Congress of the United States in inaugurating federal aid to the several states of the Union for the purpose of aiding and encouraging them to build and maintain good roads; and that this Congress herewith memorializes the Congress of the United States that federal aid be further extended and that, in order that such appropriations as may be made shall be expended to the best interest of the federal government and the people of the several states, Congress shall establish a separate department of roads, and that to this department shall be transferred the present Office of Public Roads.

2. Whereas, we recognize the scarcity of properly trained and skilled road engineers to superintend the construction and maintenance of the public roads throughout the nation; Be it Resolved, that this Congress recommends to the several states not already provided therewith, the importance of establishing and maintaining proper schools for the education and training of such engineers in order that public road funds may be economically and efficiently expended; and we also recommend that every state not already provided therewith establish an efficient highway engineering department under the proper officials.

3. Whereas, the question of the maintenance of the public roads still remains perhaps the most important problem of road improvement; Be it Resolved, that this Congress again emphasizes the need of the states and the counties of the several states providing adequate funds for the maintenance of their public roads after construction and it is the sense of this Congress that for every appropriation that is made for the construction of a public road there should be made, at the same time, a suitable provision for the maintenance of said road.

4. Whereas, there is at the present time practically no uniformity in the laws of the several states pertaining to the building, maintenance and use of roads; Be it Resolved, that the President of this Congress be instructed to appoint a committee of three to confer with and interest the American Bar Association in regard to formulating uniform laws relating to the building, maintenance and use of roads;

5. Resolved, that this Congress emphatically recommends the

enactment of proper laws, by all the states, which will provide for the employment of prison labor in the improvement of the public highways.

6. Whereas, there has been created, through the influence of the Daughters of the American Revolution, a widespread interest in preserving the location of the old roads and trails which opened up and led to the development of the western sections of our country; and whereas, nearly all these have been definitely located and marked; and whereas, it has been reported to this Congress that motor vehicle and accessory manufacturers and dealers have agreed to contribute a sum of money equal to one-third of one per cent. of their gross earnings for the years 1913, 1914 and 1915 towards the cost of construction of a highway along said trails: Be it Resolved, that this Congress highly commends the proposition that has been made that an "Old Trails, Ocean-to-Ocean Highway" shall be built following as closely as possible along the line of these old trails from the Atlantic to the Pacific, and most heartily commends the proposition of the manufacturers and others to support and aid in the construction thereof.

7. Resolved, that this Congress heartily commends the work and efforts of the Office of Public Roads in the Department of Agriculture for the betterment of the public roads of this country.

8. Whereas, the attention of the Congress has been called to the deplorable condition of a portion of the public highway leading from Washington to the National Cemetery at Arlington: Be it Resolved, that this Congress herewith requests the Congress of the United States to make a suitable provision for the construction of a beautiful highway leading from the City of Washington to this cemetery.

9. Resolved, that the sincere thanks of this Congress be extended to the state of New Jersey for its most cordial welcome to the Congress as expressed by His Excellency, Governor Woodrow Wilson, and it especially appreciates the patriotic and inspiring address of Governor Wilson endorsing the good roads movement; and it also tenders its thanks and gratitude to the several exhibitors for the splendid displays that they have made, which have been one of the most interesting, attractive and instructive features of this Congress; and that the Congress acknowledges and appreciates the courtesy of the press for the reports that it has made of the Congress.

Friday, October 4.

The Maintenance and Construction Section, in which were included the proceedings of Friday and Saturday, was called to order Friday morning by Col. E. A. Stevens, State Commissioner of Public Roads of New Jersey, the chairman of the section. In a brief introductory address Col. Stevens referred to his experience of two years as head of the Highway Department of New Jersey, and took up the justifiable cost of road improvement. When the construction of a road between certain points is under consideration, he said, the question of the cost which the expected benefits will justify often arises. Well-paved roads, he said, with easy grades and without unnecessary or too sharp curves will always cost more money and will always draw more traffic, and if this traffic is sufficiently great will yield better returns than less expensive roads. If, however, the traffic is not great enough the construction of an expensive pavement is a waste of money.

Commissioner Stevens was followed by Col. Spencer Cosby, C. E., U. S. A., who represented the Corps of Engineers of the United States Army and presented a paper entitled "Road Construction by the Corps of Engineers of the United States Army." Col. Crosby's paper will appear in full in a future issue.

The program for the remainder of the congress provided for the division of the proceedings into eight subsections, including 21 questions, each of which, according to schedule, was to be discussed in a set paper. The Construction and Maintenance Section was expected to occupy four sessions—two on Friday and two on Saturday—but in order to permit the use of a stereopticon to illustrate some of the papers, a session was held on Friday evening, and this, together with the omission of papers on a number of questions because of the absence of those who were scheduled to present them, made it possible to finish the congress at the morning session on Saturday.

The first speaker after Col. Cosby was Gervais Lombard, Acting State Highway Engineer, of Louisiana, who presented a discussion on Question 1 (Surveys) under Subsection A (Location and Grades), the formal paper on which was scheduled for presentation by Professor E. L. Griggs of the University of Georgia, who was not present. Mr. Lombard treated the subject with especial reference to practice in the state of Louisiana, explaining in detail how surveys were made by the highway authorities in that state. He also gave cost data on such work stating that the average cost of preliminary surveys was about \$10 per mile, for field work.

J. W. Howard of New York City spoke next, discussing the question of long term bond issues, the point emphasized being the undesirability of issuing bonds for periods greatly in excess of the probable life of the pavement. Others taking part in the discussion at this time were W. P. Blair, Secretary of the National Paving Brick Manufacturers' Association, and James Owen, County Engineer of Essex County, N. J. Mr. Owen said that the ideal limiting grade should be 4 per cent., and also called attention to the fact that in some cases the element of time enters into the consideration of determining ruling grades. Under present traffic conditions, he said, it is possible in some cases to raise the limit to some extent.

The next speaker was Prof. E. B. McCormick of the Kansas State Agricultural and Mechanical College, who presented a paper on Question 3 (Grades, Tractive Resistance of Various Surfaces, Relation to Traffic, etc.), under Subsection A. The first part of Professor McCormick's paper consisted of a discussion of the factors entering into traffic resistance and a description of the methods of conducting tests for its determination. He then described in detail both the methods and apparatus used in tests made by the Kansas State Agricultural and Mechanical College. Basing his opinion on the results of the tests, he favored granite block or vitrified brick, with joints filled with a soft filler which allows horses to get a grip on the pavement, for use on steep grades.

The next speaker was W. S. Keller, State Highway Engineer of Alabama, who presented a paper on sand-clay roads. This paper, which was the first scheduled under Subsection C (Road Surfaces), will appear in full elsewhere.

Mr. Keller was followed by C. Gordon Reel, State Superintendent of Highways of New York, who read a paper on "Trunk Line Highways." This paper was scheduled for presentation at the Legislative Section on Wednesday afternoon, but was postponed until Friday, because of Superintendent Reel's inability to be present on Wednesday. Mr. Reel's paper described in considerable detail the road system in New York State, including the state, county and town roads. He first gave statistics showing the mileage of roads of various kinds in the state, and traced the successive laws under which highway work in New York has been administered. Under the old laws, road improvement was made at random throughout the state, he said, and exhibited a map showing this condition. He then took up the law of 1908 and that of 1911 and exhibited another map showing the present system of trunk lines and also the expedited routes provided for last year. He also touched upon the methods of construction employed on the state roads and referred briefly to the recently adopted plan of marking roads by means of colors. As Mr. Reel's paper covered, in general, the same ground as the first article in this issue it will not be given in more detail.

After brief remarks by one or two speakers on various phases of the subjects discussed at the morning session and the presentation and adoption of a resolution advocating the construction of a Lincoln Memorial road, the congress adjourned until afternoon.

The afternoon session was called to order shortly after-

two o'clock by Col. Stevens. The first four papers presented at this session were on Questions 6, 7, 8 and 9, under Subsection C (Road Surfaces).

Albert T. Goldbeck, Testing Engineer of the United States Office of Public Roads, was the first speaker of the afternoon and presented a paper on Question 6 (Gravel and Stone—Qualities, Tests and Selection). Mr. Goldbeck's paper was practically a condensation of a part of Bulletin No. 44 of the Office of Public Roads, prepared by Mr. Goldbeck and Frank H. Jackson, Jr., also of the Office of Public Roads. The subject of the physical testing of road building rocks as presented in that bulletin is covered by an article entitled "Physical Testing of Road Building Rock," the first installment of which appears in this issue. Mr. Goldbeck's paper was followed by a short discussion participated in by County Engineer Owen of Essex County, N. J., and others. Mr. Owen called attention to the desirability of securing stone which breaks into cubical shape and also said that cementing value is not of great importance except where there is no frost.

Dr. A. S. Cushman, Director of the Institute of Industrial Research, the next speaker, presented a paper on Question 7 (Bituminous Materials, including Tars, Asphalts and Oils—Qualities and Tests). Bituminous materials were divided by Dr. Cushman into three classes: (1) native asphalts; (2) petroleum oil residuums, and (3) tars and tar products. In his opinion, he said, all of these may be good if carefully selected with a view to the special use for which they are intended. He also called attention to the fact that a bituminous binder, unlike other materials such as steel and cement, might be suitable for work in the north and yet unfit for work in the south and vice versa, and that one which is perfectly satisfactory in summer may be unsuitable in winter, while one giving satisfaction in winter may be quite unsatisfactory for use in summer. Dr. Cushman also spoke at some length on the various physical and chemical properties of bituminous materials and upon the tests for determining them.

The next speaker was State Highway Commissioner MacDonald of Connecticut, who was introduced by Chairman Stevens to take the place of Austin B. Fletcher, State Highway Engineer of California, who was scheduled to read a paper on Question 8 (Construction of Gravel and Water Bound Macadam Surfaces). At the beginning of his address, Commissioner MacDonald said that had the matters of subgrade, foundation, width and direction been taken up more extensively and the refinements of road building left for a while, millions of dollars might have been saved. Many failures, he said, have been made with good methods but poor materials, and vice versa. He also touched upon the use and abuse of the road grader, pointing out that either good or bad results follow its use depending upon the manner in which the work is done. Speaking of road building in Connecticut, Commissioner MacDonald said that although there is as much trap rock in that state as in any state, it is found to be economical to build good gravel roads and good hardened roads. In the last two years, he said, 65 per cent. of the roads built by the state have been of these two types. More roads, he said, are spoiled by lack of common sense than by lack of technical ability. The foundation, he said, is one of the most important factors and is too little thought of. In Connecticut the subgrade is crowned in the same manner as the finished surface. He also called attention to the necessity for removing all soft material from the subgrade, saying that such matter is fatal to a road, especially in such a climate as that of Connecticut, where there are heavy frosts. He advocated the use of gravel, sand or other unyielding foundation that will not invite frost, or else a telford foundation, and described the methods of employing telford and of underdraining followed by the Connecticut State Highway Department. In describing

standard Connecticut methods for the construction of gravel roads, Commissioner MacDonald laid special emphasis upon the construction of the shoulders, the selection of gravel and the providing of proper drainage. Commissioner MacDonald also explained the splinter treatment, which consists of applying trap rock screenings to the road surface, wetting and rolling. This treatment, he said, usually gives the best results when applied about six months after the construction of the road, and is the best plan he has found for putting roads into condition. Commissioner MacDonald then took up the question of macadam road construction and gave a detailed explanation of the methods employed in Connecticut.

At this point, M. de Pulligny spoke briefly, expressing his appreciation of the action of the American Association for Highway Improvement in making him an honorary member of the association on the previous day.

The last speaker was Professor Arthur H. Blanchard of Columbia University, New York City, who presented a paper on Question 9 (Construction of Surfaces with Bituminous Materials). Professor Blanchard's paper appears elsewhere in this issue.

On Friday evening, an extra session was held for the purpose of enabling those who desired to do so to illustrate their papers. The first address of the evening was made by Theo. A. Randall, Secretary of the National Brick Manufacturers' Association, who presented a paper on Question 10 (Brick Roads—Materials, Construction and Maintenance). Mr. Randall's paper which was illustrated by a number of lantern slides described in detail the methods employed in the construction of brick pavements and stated the claims for the advantages of pavements of this type. This paper will be given more extended notice in a later issue.

The second address of the evening was made by Glenn Brown, Secretary of the American Institute of Architects, who read a paper entitled "Making Highways Attractive." This paper consisted of a discussion of Question 20 under Subsection G (Roadsides). Mr. Brown emphasized the desirability of so treating the roadsides as to make them attractive and explained different ways in which this object can be accomplished. The paper dealt largely with the planting of trees along highways, and also touched upon the utilization of hedges, stone walls, vines, boulders and other means of adding to the beauty of the roads. He also touched upon the advantages of so designing bridges as to secure beauty as well as strength and utility, the placing of wires underground, the removal of advertising signs, and other points. The paper was profusely illustrated by lantern slides showing what had been accomplished in various places in the way of beautifying highways.

A paper on "Park Roads" (Question 19, Subsection F—Streets and Parks in Cities and Towns), by Linn White, Engineer of the South Park Commission, Chicago, Ill., was also presented at this meeting. This paper will be taken up in a later issue.

Saturday, October 5.

The last session of the congress was called to order at about 10 o'clock, Saturday forenoon. The first speaker was A. N. Johnson, State Highway Engineer of Illinois, who presented a paper on Question 11 (Concrete Roads—Materials, Construction and Maintenance) under Subsection C (Road Surfaces). Mr. Johnson's paper comprised a description of the ideal pavement, with especial attention given to the various details of construction such as proportioning and depositing the concrete, providing for expansion, finishing, and the like. The action under temperature changes is one of the most striking features of concrete pavements, he said. Such a pavement is always mov-

ing and the motion is resisted to some extent by the friction of the pavement on the soil. Cracks are bound to occur, he said, and to prevent their haphazard formation expansion joints must be provided. These, however, are the weak points in the pavement and the fewer of them there are the better. They should be put in at intervals of 40 to 50 ft., according to Mr. Johnson. It has been said that expansion joints are not necessary as the shrinkage when setting about equals the expansion, but Mr. Johnson stated that he did not believe the theory would work out as concrete in a pavement is in the form of a long, thin sheet not capable of sustaining high stresses. In regard to the longitudinal cracks which sometimes develop in concrete pavements, Mr. Johnson said that the setting of the center before the rest of the pavement sets may be responsible for this, but he thought it more probable that these cracks are caused by the surface water running to the side of the pavement and getting under it. To prevent this, he said, coarse aggregate may be put under the pavement at the edges and leakouts, in the form of drains leading to the side ditches, put in at intervals of about 50 ft. Most concrete roads, he said, are built in either one or two courses, in the two-course work, the first course being a lean course and the upper course a richer mixture. There is a distinct disadvantage, according to Mr. Johnson, in the two-course work because of the likelihood of the upper course buckling under expansion and leaving a small space between it and the lower course.

In laying a concrete pavement, he said, care must be exercised to prevent the drying out of the pavement too quickly. The thickness of a concrete road need not be much greater than that of a macadam road, but the subgrade must be kept drained, perhaps even more thoroughly than with macadam. The crown of a concrete road, he held, need not be greater than $\frac{3}{4}$ in. to the foot in most cases and can be reduced to $\frac{1}{4}$ in. to the foot for wider roads.

In closing, he said that concrete construction has not been under observation long enough so that general rules for maintenance can be laid down. The most common trouble, he said, is the crumbling of the pavement at the edges of cracks, and although repairs may be made by grouting, such a method will not remove the cause and so a pavement must be allowed to move by providing expansion joints. The soft material used for filling expansion joints, he said, will be squeezed out during the summer when the pavement expands, and in the fall the joints should be thoroughly cleaned out and refilled with plastic material.

In reply to a question as to the cost of concrete pavements, Mr. Johnson replied that it should not exceed \$1 per sq. yd. In reply to another question in which the matter of super-elevation on curves was brought up, Mr. Johnson replied that road builders would sooner or later have to provide for this feature. In reply to a question as to whether sand or gravel is necessary for the subgrade, Mr. Johnson replied that it is not.

At this point, Mr. Page described briefly the experimental work of the government near Washington. Nine sections of bituminous road have been built, he said, some by the penetration method and some by the mixing method, and traffic records have been kept. The government is now continuing the work and putting down the more expensive forms of pavements, which will include bituminous roads built by the mixing method under both the Washington and Topeka specifications and with various minor differences in the construction. There will also be sections of vitrified brick and of concrete.

The next speaker was Wm. H. Connell, Chief of the Bureau of Highways of Philadelphia, Pa., who presented a paper on Question 12 (Experimental and Special Surfaces

Applicable under Special Conditions) under Subsection C (Road Surfaces). Mr. Connell's paper will be given more extended notice in a later issue.

The next speaker was Geo. W. Cooley, State Engineer of Minnesota, who presented a paper on Question 13 (Earth, Sand-Clay and Gravel Roads) under Subsection D (Maintenance). Mr. Cooley's paper was devoted chiefly to a description of conditions obtaining in Minnesota, and to the methods employed there for maintenance, and in the discussion which followed he described the straw roads which have been employed in that state in sandy localities. These roads are graded to a width of 60 ft. and divided into three strips, the center one being used for traffic and the two on the sides for the planting of German yellow clover and rye. Two or three times a year the growth on the side strips is cut and raked out upon the road, covered with rye straw to a depth of 3 ins. and then after a day or two covered with sand. This has been done for three years, according to Mr. Cooley, with the result that the character of the roadbed has been modified by the addition of vegetable matter and the road has been greatly improved. Bark, sawdust and small chips have also been used in the same way.

The next speaker was James Owen, County Engineer of Essex County, N. J., who presented a paper on Question 14 (Water Bound Macadam), also under Subsection D (Maintenance). In regard to road building, Mr. Owen said that as a rule we are in a constructive stage but in some communities this has been passed and maintenance is now the chief subject. He then took up the methods of maintenance of water bound macadam in a general way, and expressed his preference for the use of water bound macadam with surface applications for dust suppression on rural roads. In some sections, at least, he said, the question of maintenance is more important than that of construction, and the statement made by State Engineer Bensen of New York that the maintenance cost is equal to 10 per cent. per year of the cost of construction is correct. The theory on which macadam roads were originally constructed, he said, was that the road would wear uniformly and patching would not be desirable or necessary, and his own practice has been to avoid patching as much as possible, as it is difficult to make a patch uniform with the rest of the road. He also referred briefly to the patrol system and indorsed it.

In connection with this subject, L. L. Tribus, Consulting Engineer of the Borough of Richmond, New York City, cited the practice of that borough in reference to water bound macadam roads. Some eleven years ago, he said, daily sweeping was started, but as it was impracticable to do the work in wet weather the sweepers were equipped with wheelbarrows, tools and materials and were employed during such time to make patches where needed. Good results were obtained by this method and the work was continued until such time as the cost exceeded a certain amount per year, when the roads were turned over to radical repair gangs which practically rebuilt them.

The next speaker was Geo. W. Tillson, Consulting Engineer of the Borough of Brooklyn, N. Y., who presented a paper on Question 18 (Street Paving) under Subsection F (Streets and Parks in Cities and Towns). Mr. Tillson's paper will be given more extended notice in a later issue.

The paper on the last question, Question 21, under Subsection H (The Relation of the Contractor to the Public Official), by C. A. Crane, Secretary of the General Contractors' Association, owing to the lateness of the hour was presented by title only. Mr. Crane's paper will be printed in full in a later issue.

After the presentation of this paper, the congress adjourned sine die.

Exhibition at the Atlantic City Road Congress

An exhibition of road machinery and materials, photographs, plans and models of various kinds was held in connection with the Atlantic City road congress. The exhibitors were manufacturers of, and dealers in, road building machinery and materials; state highway departments; publications dealing with road questions, and the U. S. Office of Public Roads. The exhibition was held in the large building at the shore end of the Million Dollar Pier. The exhibitors were as follows:

The Acme Road Machinery Co., Frankfort, N. Y.: Photographs and literature descriptive of its road making machinery.

The American Asphaltum & Rubber Co., Chicago, Ill.: Samples of asphaltic concrete, a model of a concrete road surfaced with asphalt, sections of pavement in which asphalt was used as a filler, and photographs.

The American Rolling Mill Co., Middletown, O.: Samples of ingot iron culvert pipe, from 8 to 60 ins. in diameter; a model of a road on a fill through which a culvert was placed, and a wheel-chair, similar to the type common on the Boardwalk, but having a body built of culvert sections.

The American Steel & Wire Co., Chicago, Ill.: Steel mesh reinforcement.

The American Tar Co., Malden, Mass.: Samples and literature.

The Amies Road Co., Easton, Pa.: Models of Amiesite road in various stages of construction, samples of the material as shipped from the plants, and photographs.

The Association of American Portland Cement Manufacturers, Philadelphia, Pa.: A collection of colored transparencies illustrating concrete road construction, and literature.

The Atlas Portland Cement Co., New York City: A truck consisting of two automobile wheels on an axle rolling continually on a circular concrete track comprising four sections, each of which represented a different class of road construction.

The Austin Western Co., Chicago, Ill.: Road drags, plows, shovels, graders of various kinds, a new 10-ton gasoline road roller, an 8-ton gasoline roller, a gasoline lawn mower, a rock crusher and a street sprinkler.

The Barber Asphalt Paving Co., Philadelphia, Pa.: Models of the Trinidad pitch lake in the British West Indies and of the Bermudez asphalt supply in Venezuela, both including the company's plants, and models of various pavements in which Barber products are used. This exhibit also included a 5-ton Iroquois tandem roller manufactured by the Iroquois Iron Works, Buffalo, N. Y.

The Barrett Manufacturing Co., New York City: Photographs of road work with Tarvia and Barrett paving pitch, and literature.

The Barron & Cole Co., New York City: The Peerless pick-up hand street sweeper; the Barron & Cole pick-up combination gutter and street sweeper; the Acme spreader cart, manufactured by the Acme Equipment & Engineering Co., Cleveland, O.; the Milburn wagon, manufactured by the Milburn Wagon Co., Toledo, O.; the Pillsbury sprayer, manufactured by Walter Cressy, Gloucester, Mass.; the Wheeling crusher, manufactured by the Wheeling Mold & Foundry Co., Wheeling, W. Va., and a grader manufactured by the Baker Mfg. Co., Chicago, Ill.

The Bausch & Lomb Optical Co., Rochester, N. Y.: Transits, tachymeters, theodolites, precise and Y levels.

The Binder Co., New York City: Literature.

"Better Roads," Jamestown, O.: Current copies of the publication.

Bucyrus Steam Shovel Co., South Milwaukee, Wis.: Photographs of the "Class 14 B" Bucyrus shovel.

The Chicago Pneumatic Tool Co., Chicago, Ill.: Air compressor with engine.

"Concrete Cement Age," Detroit, Mich.: Current copies of the publication.

The Concrete Guard Rail Co., Rochester, N. Y.: A length of concrete guard rail, and literature.

The Dolarway Paving Co., New York City: A section cut from a Dolarway pavement which had been in use for several years, photographs, and literature.

The Emerson-Brantingham Co., Waynesboro, Pa.: A Peerless 10-ton tractor and a 10-ton road roller.

"Engineering & Contracting," Chicago, Ill.: Current copies of the publication.

"Engineering News," New York City: Current copies of the publication.

"Engineering Record," New York City: Current copies of the publication.

The Equitable Surety Co., St. Louis, Mo.: Literature.

The A. B. Farquhar Co., York, Pa.: A new 8-ton, 30 HP. gasoline tractor and a 20-HP. steam hauling engine.

The Frick Co., Waynesboro, Pa.: A wheel of the traction engine manufactured by the company.

"Good Roads," New York City: Current copies of the journal.

The Good Roads Machinery Co., Kennett Square, Pa.: Sections of corrugated and cast iron culverts; and models of the Indiana rock crusher, the Champion rock crusher, the Indiana grader, the Buckeye Little Winner road machine, and photographs of the work performed with these machines and others manufactured by the American Road Machine Co., Kennett Square, Pa.; the Climax Road Machinery Co., Marathon, N. Y.; the Indiana Good Roads Machine Co., Ft. Wayne, Ind., and the Monarch Road Roller Co., of Groton, N. Y., for which the Good Roads Machinery Co. is selling agent.

The Hastings Paving Co., New York City: Samples of asphalt block and a model roadway of Hastings paving blocks.

Charles Hvass & Co., New York City: Hvass scarifiers, a street sweeping machine, a sand sprinkler and a tar kettle.

The Institute of Industrial Research, Washington, D. C.: A centrifugal extractor, a penetrometer, a viscosimeter, a flash tester, a ductility testing machine, and other testing apparatus used by the institute.

The Kent Machine Co., Kent, O.: A Kent Precision concrete mixer and detached parts, showing the operation of the machine.

The Keystone National Powder Co., Emporia, Pa.: Boxes and cartons in which powder and dynamite are shipped, and dummy sticks of dynamite and cartridges.

The Koehring Machinery Co., Milwaukee, Wis.: A No. 14 concrete mixer and an asphalt mixer.

The Municipal Engineering and Contracting Co., Chicago, Ill.: An Austin cube mixer, photographs, and literature.

"Municipal Journal," New York City: Current copies of the publication.

The National Paving Brick Manufacturers' Association, Cleveland, O.: Samples of brick manufactured by the various companies which make up the membership of the association, a section of a pavement which had been down 18 years, and photographs.

The National Safety Wood Paving Co., Philadelphia, Pa.: Samples of wood blocks equipped with metal "grids" to prevent slipping.

The Robeson Process Co., Au Sable Forks, N. Y.: A section of a glutrin bound road laid in 1909, and a demonstration of a laboratory test of a road of that character.

The Spray Nozzle Co., Boston, Mass.: Samples of various kinds of spray nozzles for distributors.

The Standard Oil Co., New York City: Models of road-

ways constructed with the company's products, samples and photographs.

The Standard Scale & Supply Co., Pittsburgh, Pa.: A concrete mixer and a working model of a mixer.

The Studebaker Corporation, South Bend, Ind.: A road oiler, a street sweeper, a dump wagon, a sprinkler, a flusher with special oiler attachment, and a combination heater and distributor.

The Sullivan Machinery Co., Chicago, Ill.: A portable rock drilling outfit, a 20 HP. gasoline air compressor, a 15 HP. air compressor, drills, and a 3-ton piece of Vermont granite on which demonstrations were made.

The Tarrant Mfg. Co., Saratoga Springs, N. Y.: A type 4 heating kettle, hand pouring pots, and a 500-gal. heating kettle.

The Texas Co., New York City: Photographs.

The Troy Wagon Works Co., Troy, O.: Photographs and literature.

The United Gas Improvement Co., Philadelphia, Pa.: Models of roads in the construction of which the company's products were used, samples of paving pitch and varnish, and photographs. Penetration tests were also demonstrated.

The United States Asphalt Refining Co., New York City: Samples of the company's products, and photographs.

The U. S. Office of Public Roads, Washington, D. C.: Models illustrating ancient and modern road construction, and models of road building machinery.

The Universal Portland Cement Co., Chicago, Ill.: Sections of concrete pavements, roadways and combined curb and gutter; models of sidewalks, of brick pavement with cement filler, and of the "Ann Arbor type" of concrete pavement with a bituminous coating.

The United States Wood Preserving Co., New York City: Photographs.

Warren Brothers Co., Boston, Mass.: Models of roads in various stages of construction, and samples of road materials.

The Watson Wagon Co., Canastota, N. Y.: Dump wagon.

A combination of cast iron pipe manufacturers, including R. D. Wood & Co., Philadelphia, Pa.; Lynchburg Pipe & Foundry Co., Lynchburg, Va.; the Glamorgan Pipe & Foundry Co., Lynchburg, Va.; James B. Clow, Chicago, Ill.; The American Cast Iron Pipe Co., Birmingham, Ala., and the Utica Pipe & Foundry Co., Utica, N. Y., exhibited samples of cast iron culvert pipe.

There were nine state exhibits as follows:

North Carolina: Photographs and literature.

South Carolina: Photographs, maps, and samples of road materials.

Illinois: Photographs and samples of road materials.

New Jersey: Road maps, plans, samples of road materials, road signs, and photographs.

New York: Plans, photographs, samples and literature.

Minnesota: Plans, photographs and literature.

Tennessee: Photographs.

Virginia: Road maps and photographs.

The Arizona state exhibit arrived late on the next to the last day of the convention and was not installed. Ohio and Kansas had their signs in booths, but had no exhibits.

California State Highway Plans

It is expected that by the time of the opening of the Panama-Pacific Exposition in San Francisco, Cal., in 1915, the two main trunk highways connecting the northern and southern parts of the state, one running down the coast line, and the other inland, will be completed. According to present plans, laterals joining county seats and other centers of population will branch off from both highways.

This work will be accomplished under the \$18,000,000 bond issue, voted by the people of the state for a system

of state highways. The State Highway Commission, appointed 14 months ago by Gov. Johnson, has completed a thorough study of the conditions throughout the state, has completed 1,500 miles of surveys, and is working on 1,200 miles more. Many of the counties and towns have agreed to furnish the necessary rights of way, culverts, etc., and 115.2 miles of highway are under construction at an aggregate cost of \$896,862. Plans and specifications for several hundred miles more have been prepared. Traffic agreements have been made with the various railroad companies which will insure the expediting of the transportation of materials, so that no delay is feared in that direction. It is also estimated that these agreements have accomplished a saving of about \$600,000.

The Commission has 306 regular employees, including all classes of workmen from the attorney and secretary of the Commission to the cook. Thirty-one surveying parties are working in various parts of the state. Actual work is in progress in 13 different localities, and it is planned to have at least 50 highway camps at work at various points throughout the state within a few months. It is estimated that it will be necessary for the railroads to transport 2,900,000 tons of crushed rock, 260,000 barrels of asphaltic oil, and large shipments of culvert pipe, lumber, reinforcing steel and other materials and equipment before the system is completed.

Road Bond Issue in Texas

Of the road bond elections held in the various counties and precincts of Texas up to October 1 of this year, 28 carried and 14 were defeated. The total amount of bonds voted was \$2,666,200.

A list of the bond elections which carried follows: Bastrop County, two issues aggregating \$180,000; Bee County, \$15,000; Calhoun County, \$100,000; Cass County, \$35,000; Colorado County, \$100,000; Ellis County, two elections aggregating \$175,000; Ft. Bend County, three elections aggregating \$355,000; Henderson County, \$35,000; Johnson County, \$75,000; Kerr County, \$20,000; Lamar County, two elections aggregating \$240,000; Live Oak County, \$1,200; Refugio County, \$25,000; Robertson County, four elections, aggregating \$500,000; Tom Green County, \$70,000; Wharton County, \$300,000; Williamson County, \$25,000; Wood County, \$120,000; Cameron County, \$250,000; Medina County, \$40,000.

The defeated bond issues amounted to \$1,802,500, and were as follows: Angelina County, \$200,000; Collin County, \$125,000; Collingsworth County, \$100,000; El Paso County, \$150,000; Hardin County, \$50,000; Haskell County, \$75,000; Hunt County, \$400,000; Kaufman County, \$200,000; Lampasas County, \$12,500; Matagorda County, \$100,000; Milam County, \$200,000; Palo Pinto County, \$100,000; Smith County, \$40,000; Van Zandt County, \$50,000. It is stated that an effort is being made in each of these counties to call another election for road bond issues.

An organized effort is under way to bring about bond elections in the following counties: Andrews, Bastrop, Bowie, Brazoria, Calhoun, Camp, Comanche, Concho, Denton, Erath, Gonzales, Gregg, Hall, Hamilton, Harris, Harrison, Hemphill, Hill, Jefferson, Jim Wells, Johnson, McLennan, Navarro, Nueces, Pecos, Potter, Runnels, Rusk, Throckmorton, Trinity, Webb, Wichita and Wilson.

The Chamber of Commerce and Business League of Mobile, Ala., is planning to restore the famous Bay Shell Road, which extended six miles along the shore of Mobile Bay, and which was destroyed by storm in 1906. A committee of the organization is now circulating a petition that the City Commission of Mobile take steps towards this end.

Convention of the Alabama Good Roads Association

The sixteenth annual convention of the Alabama Good Roads Association, which was held at Birmingham, Ala., October 8, 9 and 10, was attended by nearly 700 delegates from counties throughout the state.

Among the prominent speakers who addressed the delegates were Hon. W. W. Finley, President of the Southern Railway; Senators Joseph F. Johnson and John H. Bankhead, Congressmen John L. Burnett and John W. Abercrombie, Lieut. Gov. Walter D. Seed and R. E. Spragins, Chairman of the Highway Commission.

Among the engineers present were R. E. Toms of the United States Office of Public Roads, V. H. Moore of Meridian, Miss., and W. S. Keller, State Highway Engineer of Alabama.

The report of J. A. Rountree, who has been secretary of the association since its organization, 16 years ago, was read. In this report he stated that during the year which has passed, the association has accomplished more in arousing interest in good roads than in any other year in its history. More public meetings have been held, more county and local good roads associations have been organized, and more miles of roads have been constructed in Alabama than in any previous year in the history of the state and of the association. At present there are 40 good roads associations in Alabama, and four district highway organizations. Since the last meeting of the association, plans have been set on foot to organize every county in the state and to stimulate to fresh effort those organizations which already exist. Good roads rallies have been held in fully 60 counties in the state during the last year. Nine counties of the state have held good roads bond elections, and bond issues have carried in seven of the counties. In one of the counties an election was lost by two votes, while in the other county the majority against the bonds was less than one hundred. In four of the counties bond issues are now pending, and in several others arrangements are being made for bond elections. According to the report, the Alabama Good Roads Association has been active in all of these campaigns, has furnished speakers and literature, and exerted every effort to advance the cause.

Under the state aid appropriation act, the passage of which the Alabama Good Roads Association was instrumental in securing, 52 counties have secured appropriations of \$2,000 each to build roads. Only 15 counties of the state have failed to avail themselves of the opportunity to secure appropriations, and it is believed that before January 1, 1913, every county of the state will accept the state aid offered.

The following officers were elected for the ensuing year: President, John Craft, Mobile; First Vice President, John O'Neill, Birmingham; Second Vice President, H. K. Milner, Hawthorn; Third Vice President, John H. Bankhead, Jasper; Fourth Vice President, Oscar W. Underwood, Birmingham; Secretary, J. A. Rountree, Birmingham. There were also elected nine district vice presidents, an executive committee, consisting of 6 members at large and 2 from each of the 9 districts, a legislative committee of 13 members, a finance committee of 13 members, and 12 delegates to the ninth annual convention of the American Road Builders' Association, to be held at Cincinnati, O., December 3-6.

The committee on resolutions reported ten resolutions, which were all adopted after considerable discussion. The first one provided for the use of all state convicts, who are suitable for road work, in the construction of public highways under the supervision of the State Highway Commission, their guarding and care to be under the supervision of the Superintendent of the State Prison. It was also provided in the resolution that this should not apply to the present method of working county convicts in their

own counties. The leasing of convicts to corporations and other private interests was condemned.

The second resolution provided that, inasmuch as the United States Congress had appointed a committee consisting of five congressmen and five senators whose duties are to report some plan for furthering federal aid, the Alabama Good Roads Association should appoint three delegates to be named by the chair to appear before this special committee of Congress in the interest of a national highway bill.

The third resolution provided that school teachers be requested to designate "good roads days" in the public schools throughout the state, to be used for giving instruction as to the benefits of good roads.

The fourth provided that the Alabama Good Roads Association recommend a bond issue by the state of Alabama for \$50,000,000 for the purpose of building a system of inter-county and state highways, and furthermore, that the convention request the next Legislature to pass an act calling an election to amend the constitution, so that the electors of the state could legally vote on the bond issue.

The fifth resolution referred to the consolidation of good roads associations, and stated that as a movement was on foot to organize a national good roads association for the purpose of consolidating the various state and district county good roads associations, the Alabama Good Roads Association indorsed the movement, and urged that the organization be perfected as soon as possible. It was further resolved that the Alabama Good Roads Association should cooperate in the movement in every possible way.

The sixth resolution recommended that there be planted along all new roads laid out in the state, and along all the existing roads laid out 50 ft. wide or more, a sufficient number of shade trees for the protection of the traveling public; the trees to be the property of the state, and the road overseers to have police power for their protection.

The seventh resolution provided for the designation of three national "good roads days" to be devoted to the building and repairing of the roads by the citizens of the various communities. The resolution also recommended that the citizens meet in schoolhouses and other public buildings each night at the completion of the day's work for a banquet and speeches on the subject of good roads. The resolution recommended their designation as county, state and national "good roads days," and suggested August 14, 15 and 16 as permanent "good roads days" throughout the nation, state and county. In connection with this resolution, the secretary of the Alabama Good Roads Association was instructed to correspond with national, state and county good roads associations, and urge the adoption of these days and the cooperation of the associations in the movement. It was resolved that a request be made to the Governor of Alabama to set aside August 14, 15 and 16 as "good roads days" by proclamation each year.

The eighth resolution extended the thanks of the association to the members of the United States Office of Public Roads for their cooperation and support.

The ninth resolution provided that the Legislature be requested to so amend the present state law as to provide that the benefits accruing from the opening of roads may be offered against damages sustained by the condemnation of land.

The tenth resolution extended the thanks of the Alabama Good Roads Association to the Jefferson County Good Roads Association and the citizens of Birmingham for the hospitality extended to the members of the association and to the delegates to the convention.

The Jefferson County Good Roads Association was host during the convention, and on the last day, October 10, served an old fashioned southern barbecue to the delegates at the Alabama State Fair.

Physical Testing of Road Building Rock—I

In the issue of August 3, under the caption "Physical Tests of Road Building Rocks," the various tests and the apparatus used in the work of the United States Office of Public Roads were described very briefly. The article referred to also reviewed Bulletin No. 44 of the Office of Public Roads entitled "The Physical Testing of Rock for Road Building," from which the data as to testing methods and apparatus were obtained.

The testing of road materials, including rock, binders and other substances which enter into the construction of

men to displacement by abrasion and is performed in the Dorry machine.

This machine, shown in Figs. 1 and 2, consists, essentially, of a circular steel disk A, which revolves in a horizontal plane about a vertical shaft B. The disk is driven through a bevel gear D, connecting with the pulley C, which is belted to the source of power. Upon the revolving disk are holders, one on each side of the machine, so arranged that the specimen may be held against the disk under a constant pressure of 1,250 grams. Near these holders are two hoppers H, from which standard quartz sand between 30 and 40 mesh size is fed on the disk to act as an abrasive agent. The two sets of specimen holders and sand hoppers are exactly alike, two being employed merely for the purpose of making it possible to run two tests on the machine at the same time.

The rock specimen used for the test consists of a cylindrical core, 25 mm. in diameter, cut from the rock sample with a diamond core drill. This is held perpendicularly against the disk under a pressure of 1,250 grams during 1,000 revolutions of the machine, the sand, meanwhile, being fed upon the disk. At the end of the test, the loss in weight is determined and the test then repeated with the specimen reversed, after which the average loss in weight, computed from the two tests, is used for determining the hardness. In earlier work with this machine, according to the bulletin, the loss in length was determined for each run and the average loss, expressed in millimeters per 1,000 revolutions, subtracted from 20, was given as the measure of hardness of the specimen, the arbitrary constant 20 being selected in order to give the results of the tests about the same range of variation as the French coefficient of wear, which will be described under the abrasion test. It was found, however, it is further stated, that while the hardest rocks lose only about 2 mm. in length for each 1,000 revolutions, some of the softer varieties lose considerably more than 20 mm. This, of course, gives negative values for the measure of hardness, and in order

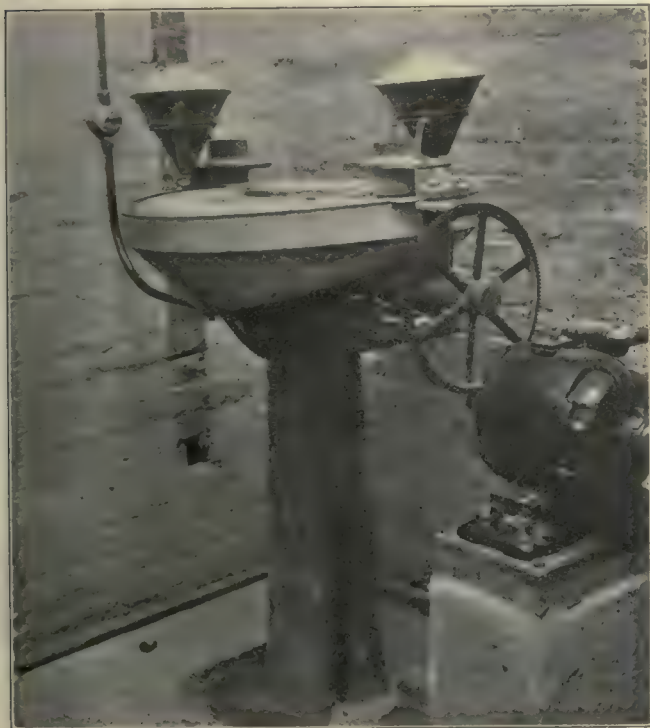


FIGURE 1.—DORRY MACHINE USED FOR THE DETERMINATION OF HARDNESS.

modern roads is of very great importance, both as a means of ascertaining the fitness of a given material, from previous knowledge of the effects of certain characteristics, and also as a means of obtaining additional data which, together with observation of its action in service, may be used in the further study of the material. While the tests described in the bulletin do not by any means include all of those in use, they do include those which have been found by the Office of Public Roads to answer the requirements of ordinary service. In this article the several tests are described in some detail and descriptions and illustrations of the principal machines are given. In this installment, the methods and machines used in the hardness test, the toughness test and the abrasion test will be described, while the second installment, which will appear in a later issue, will deal with the methods and apparatus used in the tests for cementing value, specific gravity and absorption.

Hardness Test

The first of the tests employed by the Office of Public Roads is the hardness test. This consists of the determination of the resistance of the surface particles of the speci-

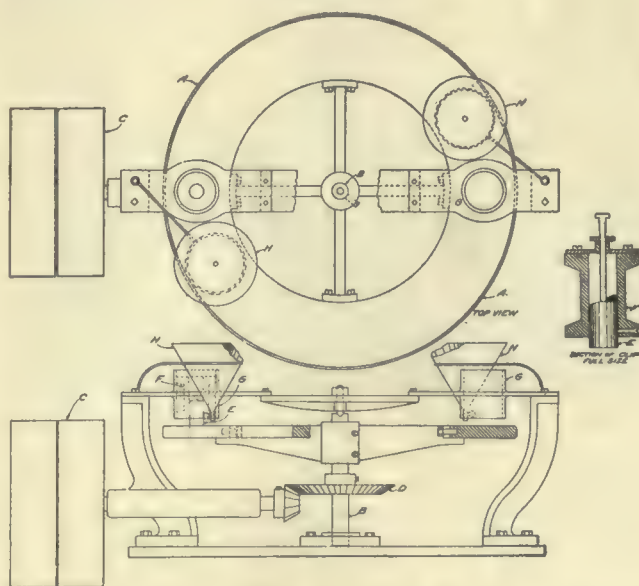


FIGURE 2.—PLAN AND SECTION OF DORRY MACHINE SHOWN IN FIGURE 1.

to avoid this the hardness is now determined by the following formula:

$$H = 20 - \frac{W}{3}$$

where H = the hardness and W = the loss in grams per 1,000 revolutions.

is held in place by proper devices at the bottom. In the sketch showing the details of the machine, the hammer, which weighs 2 kg., is marked N and is guided by the two vertical guide rods J. In the top of the hammer a small cone is set, which fits snugly into a concentric electro-magnet attached to the lower side of the crosshead M. At the back of this crosshead there is a slot through which



FIG. 3.—PAGE IMPACT TESTING MACHINE.

Toughness Test

Toughness as applied to road material may be defined as that quality of the material by which it resists fracture under impact. The test for this used in the Office of Public Roads is one developed by Logan Waller Page, Director of the Office, and is performed with an apparatus known as the Page impact machine, which is shown in Figs. 3 and 4. The machine consists, essentially, of upright guides down which a weight is allowed to fall upon the specimen, which

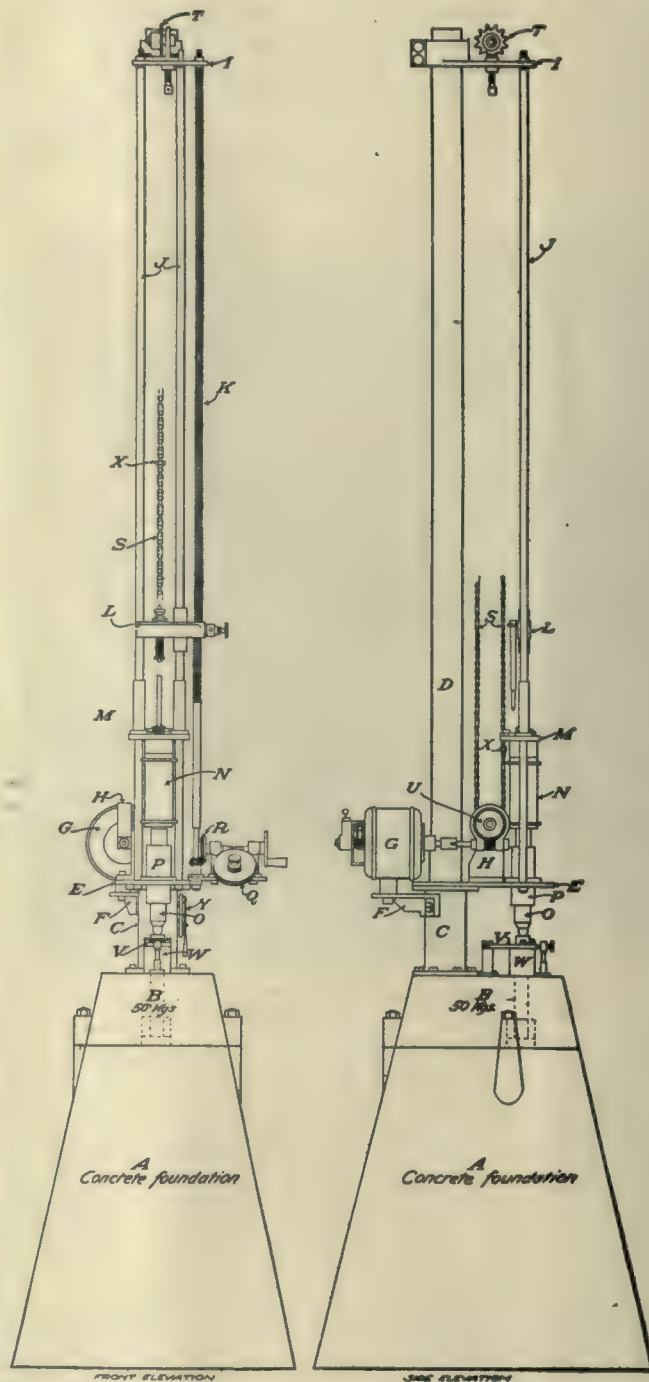


FIG. 4.—DETAILS OF IMPACT MACHINE.

the sprocket chain S passes. This chain is supported on sprocket wheels T and U at the top and bottom of the machine. The lower sprocket is directly connected with the electric motor G by a worm gear. On the sprocket chain there are two small lugs which engage a spring bolt attachment projecting inward on either side of the slot in the crosshead M, thereby raising the crosshead until it is tripped by a rod projecting downward from an upper crosshead L, which can be set at any desired height by means

of the revolving screw K. When the machine is in the position shown in the sketch, a current is passing through the electro-magnet attached to the crosshead N, so that when the machine is started the sprocket chain through the lug X, engaging the crosshead N, raises the crosshead, and, therefore, the hammer, until it is tripped, as noted. The electro-magnet is supplied with current from the circuit in which the motor is placed, the current being carried through two small conductor rods running parallel with the guide rods, both of which are insulated from the machine. The current passes from one of these conductor rods through a small carbon brush to a make and break attachment on the upper crosshead L, thence down one of the guide rods through the electro-magnet and back to the other conductor rod. When the crosshead M comes in contact with the make and break on the crosshead L, the hammer is released and falls, striking the plunger O. This is made of armor piercing steel, with the maximum temper at the lower end, which is spherical in shape. The specimen under test rests on a hard steel anvil W and the plunger rests on the upper surface of the specimen. The revolving screw K, by means of which the upper crosshead L can be set at any desired height, is geared at its lower end to a dial Q, upon which may be read directly the height of the make and break attachment and, therefore, of the hammer drop. This screw and dial permit the setting of the upper crosshead to within 1 mm. of the desired height.

mond dust is held. The saw is driven at a speed of 600 r.p.m. by means of a small electric motor.

The faces of the specimens are trued up by means of a machine known as a grinding lap. This consists of a vertical disk of fine grained cast iron, 9 ins. in diameter and $\frac{1}{2}$ in. thick. It is supported upon a vertical ball bearing shaft and revolves at 400 r.p.m. The abrasive agent used is finely powdered emery.

Abrasion Test

The abrasion test is used in the Office of Public Roads as a measure of both hardness and toughness. The test has yielded much valuable information on the wearing qualities of rock since it was originated, and is performed by means of an apparatus known as the Deval machine.

This machine, a sketch of which is shown in Fig. 5, consists of four cast iron cylinders mounted upon a driving axle in such a way that the axes of the cylinders make an angle of 30° with the axis of rotation. The cylinders are 20 cm. in diameter and 34 cm. long. The other dimensions are shown in the sketch. The shaft is carried in three bearings marked D, and at E carries a commutator ring for operating an electrical revolution counter, which is not shown in the sketch. The cylinders are held in place in the frame by means of the arms shown at the sides of the cylinders, which are hinged on the frame and threaded and provided with a nut at the lower end. When the

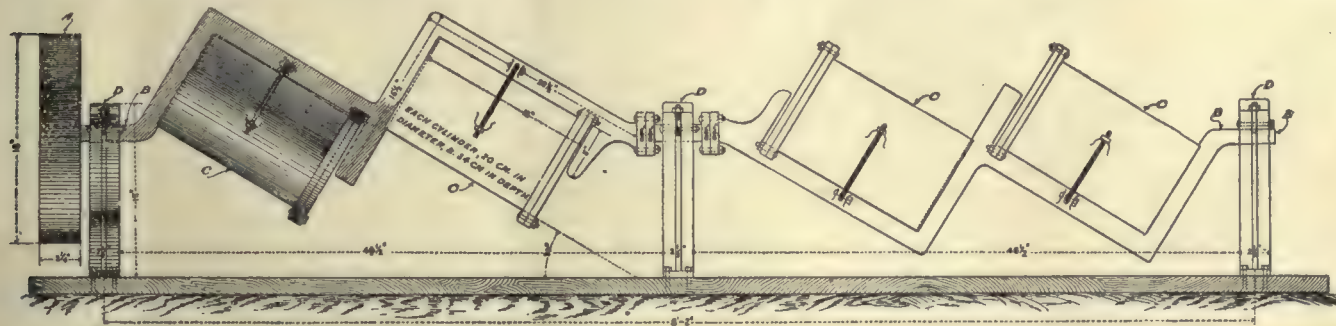


FIGURE 5.—SKETCH SHOWING FRONT VIEW OF MACHINE OF THE DEVAL TYPE USED IN THE ABRASION TEST FOR HARDNESS AND TOUGHNESS.

The blow delivered from the spherical end plunger very nearly approximates the character of the blows struck by traffic. This arrangement has the further advantage of not making it necessary to get the two bearing surfaces of the test piece exactly parallel, since the entire load is applied at a point on the upper surface. In carrying out the test, successive blows of the hammer are made, the first fall being through a height of 1 cm., and each succeeding one through an increased height of 1 cm. The number of blows required to cause failure is used to represent the toughness.

Besides these two machines, several pieces of auxiliary apparatus are used in preparing samples for the hardness and toughness tests. The cores used for each of these tests are made with a core drill. This machine consists of a steel tube mounted vertically in a suitable frame with the necessary bearings and driving mechanism and carrying at its lower end a brass ring containing 8 carbon points placed at equal distances around the bottom. These points are set alternately on the inner and outer edges of the ring, the size of which is such that cores 25 mm. in diameter are cut. An arrangement at the shank of the drill allows water to enter the core tube and run down the inside of the drill.

The cores, after they come from the drill, are sawed to the proper length by means of a diamond saw. This is a vertical steel disk $5\frac{1}{4}$ ins. in diameter and .02 in. thick, having radial slots around the circumference in which dia-

cylinder has been charged it is placed in the frame, the arm on each side brought down to engage with the lug on the side of the cylinder and the nut screwed up against the outside of the lug. The cylinder covers are bolted on by means of bolts passing through the flanges, as shown.

In running the test, the rock is broken in pieces of as nearly uniform size as possible, and 50 of these pieces are used for a test sample. The total weight of the rock used in the test is within 10 grams of 5 kg., the weight being obtained after all the test pieces have been thoroughly dried. The charge is then placed in the cylinders and the machine run for 10,000 revolutions at the rate of between 30 and 33 r.p.m. Only that material worn off which will pass through a 0.16-cm. ($1/16$ -in.) mesh sieve is considered in determining the amount of wear. The amount of wear may be expressed either as the percentage of the material worn off, or what is known as the French coefficient may be used. This latter is determined by the following equation:

$$\text{Coefficient of wear} = 20 \left(\frac{20}{W} \right) = \frac{400}{W} = \frac{40}{\% \text{ of wear}}$$

in which W = weight in grams of the detritus under 0.16 cm. ($1/16$ -in.) in size per kg. of rock used. The constant 20 in this equation is used because of the fact that only the best varieties of rock show a loss in weight of less than 20 grams per kg., or 2 per cent. of the original weight.

[To be continued.]

Construction of Surfaces With Bituminous Materials*

By ARTHUR H. BLANCHARD, C. E.†

Various kinds of bituminous materials have been used in the United States in the construction of roads and pavements for over fifty years. The introduction of the use of bituminous surfaces and bituminous pavements in the construction of highways, outside of built-up districts, is of comparatively recent origin in this country, dating practically from 1906. Since that period the growth of the use of asphalts, asphaltic oils and tars has been exceedingly rapid. For example may be cited the increase in the yardage of bituminous surfaces and bituminous pavements constructed with bituminous materials, not including light oils, under the jurisdiction of eight state highway departments of the East. In 1908 the total yardage was 416,700, while in 1911, 17,749,000 square yards were constructed. The discussion of this subject will be presented in the form of a brief resume of typical current practice and a review of some of the causes of failure of the different types of bituminous surfaces and bituminous pavements.

In order to avoid misunderstandings, the various methods of using bituminous materials referred to in this paper will be explained by the following definitions.

Bituminous surfaces are those consisting of superficial coats of bituminous materials with or without the addition of stone or slag chips, gravel, sand or materials of a similar character.

Bituminous macadam pavements are those consisting of broken stone and bituminous materials incorporated together by penetration methods.

Bituminous gravel pavements are those consisting of gravel and bituminous materials incorporated together by penetration methods.

Bituminous concrete pavements are those having a wearing surface composed of stone, gravel, sand, etc., or combinations thereof, and bituminous materials incorporated together by mixing methods.

Bituminous surfaces are usually constructed on macadam or gravel roads, or on bituminous pavements or cement concrete pavements. A notable innovation is the use of bituminous surfaces on brick and wood block pavements. In the case of roads, the mode of procedure is to thoroughly clean the surface by sweeping with hand brooms or horse sweepers or a combination of these methods. The bituminous material, which is generally heated, is applied to the surface with the aid of pouring cans, hose attached to gravity tanks, hand-drawn gravity distributors, horse-drawn or power-driven gravity distributors and pressure distributors. After a varying interval, some kind of mineral coating is generally applied to cover the bituminous material.

The causes of failure of bituminous surfaces are numerous. They may be considered from the standpoint of the condition and character of the original surface, the material used, the method of construction or local conditions.

The failure of bituminous surfaces from the standpoint of the character of the original surface is many times due to failure on the part of those in charge to place the surface in satisfactory condition before the application of the bituminous material. Many cases are noted where bituminous materials are applied over a surface in which are found many potholes and ruts, or which is dirty

due either to accumulated dust and dirt or to the original method of construction. With certain kinds of materials a damp condition of the surface has resulted in failure.

From the standpoint of the physical and chemical properties of the material, many instances may be cited in which failure is due to the materials not having the proper characteristics for the conditions under which they are employed. As an example might be cited the case of a prominent thoroughfare in one of our large cities which is subjected to motor-bus traffic and a large amount of motor car and horse-drawn vehicle traffic. This road is constructed of gravel upon which has been applied an asphaltic oil and gravel top dressing. The surface at the present time in many sections in full of ruts caused by the traffic pushing the material from side to side. Again the large percentage of volatile constituents contained in certain asphaltic oils has rendered surfaces constructed with them unsatisfactory because of the long period required for these surfaces to "set up" so that the bituminous material will not track or the carpet thus formed will not creep and form waves and humps. In certain cases the use of light oils on tar or asphalt surfaces has softened the original bituminous surface to such an extent as to render the road or pavement unsatisfactory for use.

From the standpoint of construction, we find failures due both to the use of too small an amount of the bituminous material and an excess of material. Improper application, resulting in uneven distribution, is accountable for many failures of bituminous surfaces, while in other cases the lack of a sufficient covering of stone chips or material of a similar character has rendered the surface sticky or mushy, sometimes in the first season and sometimes not until the second summer.

There are numerous instances where bituminous surfaces have been adopted under conditions which call for the construction of bituminous concrete pavements or even some type of block pavements. A mat type of construction, which has been employed to a considerable extent, has proved inefficacious in cases where horse-drawn vehicle traffic has been more than a certain amount in combination with a motor car traffic which in amount was not sufficient to satisfactorily iron out the calk holes caused by the horse-drawn vehicle traffic. There are cases where esthetics should govern the selection of the type of surface, and generally in such cases the black or brown surface resulting from the use of bituminous material does not harmonize well with the environments.

Bituminous macadam and bituminous gravel pavements are of many types, one of the primary differences in construction being the use of one or two applications of the bituminous material. The efficacy of many of the types depends upon the combinations of sizes of broken stone or gravel and the combinations of bituminous materials used when two applications are employed. Variations in types also exist dependent upon the manner in which the different courses may be filled and the treatment of the filled course prior to the application of the bituminous material. The one application method is very similar in its simplest form to the construction of a bituminous surface except that the bituminous material is applied upon a much more open surface. In the case of the two application method in certain instances an attempt is made to build up a two-course pavement, while in others the second application is in reality used as a seal coat.

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Unfortunately many are the instances where improper bituminous materials have been employed. In some cases the materials were satisfactory in themselves but were used improperly. Many engineers having charge of bituminous work do not appreciate the cold fact that different types of bituminous materials have entirely different physical properties and require entirely different treatment in use, although they may have been purchased under one and the same specification covering chemical and physical properties. In some cases entirely unjustifiable combinations of materials are employed. For instance, one case is in mind where an asphalt of excellent characteristics was used for the first application, while for the second application an asphaltic oil having decidedly solvent and fluxing properties was employed. Overheating of the material has likewise proved the cause of many failures as thus the properties of the materials are sometimes changed and in many cases the materials are ruined.

Under the heading construction, we find failures due to the uneven distribution resulting especially from the improper use of hand-pouring pots and hand-drawn distributors and also in many cases when horse-drawn or power-driven distributors are employed. Many unsatisfactory bituminous macadam pavements result from the use of the wrong sizes of broken stone. One instance will be cited where a hard broken stone ranging from 2 to $3\frac{1}{2}$ ins. was used for the wearing surface. After rolling, $1\frac{1}{2}$ gals. of bituminous material was applied and the road finished with a layer of chips. The rapid formation of fine cracks due to the rocking movement of the individual stones under traffic, finally resulting in raveling and general disintegration, is of common occurrence. Segregation of sizes of stone, preventing uniform penetration, results in weak spots in some cases and "fat" spots in others. In certain cases, after a rain, the construction has been carried on before the broken stone immediately below the surface has dried out. Many of the causes to which the failures of bituminous surfaces are attributed may likewise apply to bituminous macadam and bituminous gravel pavements.

Bituminous concrete pavements other than sheet asphalt and pavements laid by companies as proprietary articles have received more attention during the past season than at any time since the days of Abbot, Leverich, Scrimshaw and Van Camp. Less fear of litigation proceedings and the introduction of economical mixing machines equipped with heating attachments have exerted a marked influence. But, furthermore, the rapidly growing recognition of the inherent advantages of bituminous pavements constructed by the mixing method has been largely instrumental in its adoption for traffic conditions for which it is believed to be economical and suitable.

This type of bituminous pavement is constructed usually by one of three methods. These methods, although overlapping to a certain extent, may be described as follows, when broken stone is used as an integral part of the mineral aggregate.

Type A consists of so-called one-size crusher run broken stone mixed with bituminous material. It should not be considered that the designation, "one-size crusher run stone," means an aggregate composed of broken stone of uniform size. This term as used here refers to the product, obtained at a crushing plant, which passes over one size of screen holes and through the next larger or passes through a screen of one size of holes and is retained upon a screen having smaller holes. It is evident to those familiar with the operation of crushers that the product thus obtained does not usually consist of stone of uniform size. For example, broken stone commercially designated as " $\frac{3}{4}$ -in.," used in the vicinity of New York City, is obtained in some cases by passing over $\frac{1}{2}$ -in. and through $1\frac{1}{4}$ -in. openings. The size of the stone varies from 1

in. to $\frac{1}{4}$ in. It is self-evident that this variation in size produces a more stable pavement than if the aggregate consisted of broken stone of uniform size. Type A has been constructed by both hand mixing and machine mixing and by using both unheated and heated stone. Many kinds of bituminous materials have been used, while in some cases one kind of bituminous material has been used in the mix and another kind for the seal coat; one of the most common combinations being the use of tar in the mix and asphalt for the seal coat.

Type B consists of one-size crusher run broken stone and sand or other fine mineral matter mixed together with bituminous material. The wearing surface of this mix is sometimes finished by rolling in fine stone chips but generally a seal coat is used together with fine mineral matter for a top dressing. When constructed on a commercial scale, the mineral aggregate is always heated and mixed in a specially constructed machine. Usually the same grade and type of bituminous material is used for the mix and the seal coat.

Type C consists of a wearing course composed of a graded aggregate of broken stone and sand with or without other mineral matter, which aggregate is mixed, after being heated, with a bituminous cement in a specially designed machine. As with Type B this pavement is finished with or without seal coats of bituminous material. The Topeka and the bitulithic pavements may be cited as examples of Type C.

Having reviewed the fundamentals of the various types, consideration will now be given to causes of failure of some bituminous concrete pavements. It should be noted that the percentage of failures of bituminous concrete pavements is much smaller than in the case of bituminous macadam and bituminous gravel pavements.

Poor and unsuitable materials have been accountable for certain failures. Attachment for a material of a certain type has led to a blind adoption of any material belonging to a given class. For instance, in one case coming under the writer's observation, crude coal tar from one gas works had given good results on the average. Based on this fact any crude coal tar was finally used although those in authority had had an object lesson in a failure due to the haphazard purchase of crude coal tar. Experiments in Rhode Island and in the Borough of Queens seem to have demonstrated that high carbon tar of a certain consistency is not as satisfactory or advisable for a seal coat as some types of asphalts, when the percentage and volume of horse-drawn vehicle traffic is large. In some cases an apparent cause of failure has been an excess of flux or of the volatile constituents in asphalt cements. Pavements constructed with such materials many times are wavy due to the movement of the surface under heavy traffic. Many cases are reported where materials have been overheated at the construction site due to the belief that all materials may be, and even should be, heated to the same temperature before using and that it is impossible to injure bituminous materials by heating to high temperatures.

During construction there are various details which demand careful supervision. Either too large broken stone or stone of too uniform size may cause a failure. Especially is this the case with very hard and tough broken stone. The rocking of the stone causes the formation of fine cracks which eventually lead to disintegration. Naturally the amount and character of the traffic are intimately connected with the condition of the pavement but cases have occurred where failure, even under very light traffic, was due to using large uniform size broken stone for the mineral aggregate of the mix. Poor combinations of sizes of broken stone and sand have resulted in segregation during mixing, transportation or spreading, resulting in pavements

of varying density and stability. Overheating of the mineral aggregate has caused burning of the bituminous material in some instances or the formation of a thin film of bituminous material over the broken stone which is not of sufficient amount to bind the adjacent stones together. The use of a wet aggregate will usually result in a poor mix with consequent unsatisfactory results. In many instances the seal coat has not been applied uniformly. The result is either not economical, due to the necessity of a second application before 75 per cent. of the surface requires treatment, or the disintegration of the pavement wherever bare spots occur in pavements where a coarse aggregate was used and where there is considerable horse-drawn vehicle traffic. Although of minor import today, some failures have been caused by using, with unheated stone, bituminous cements which will not adhere satisfactorily or which only mix with great difficulty under such conditions.

Many failures are due in both the case of bituminous macadam and bituminous concrete pavements to poor founda-

tions. Sufficient attention has not been paid to this important part of the pavement.

Many of the above causes of failure would be eliminated if engineers would devote more time to a consideration of the physical and chemical properties of the materials which they employ. Records should be at hand covering these data, and details of the success or failure of every road noted. If a bituminous material laboratory is not connected with the department, it should not be either expensive or difficult to secure certified analyses made by reputable chemical engineers.

In closing the writer wishes to emphasize the fact that a careful consideration of the causes of failure of bituminous surfaces and bituminous pavements constructed during the past five years will result in material benefit, inasmuch as a comprehensive knowledge of the various causes of failure is one of the most valuable assets of engineers having in charge the construction and maintenance of bituminous surfaces and bituminous pavements.

Road Legislation and Syndic Associations in France*

BY M. DE PULLIGNY.†

France possesses a network of public highways as remarkable by reason of its vast extent as by the good condition of the roads as a whole. These highways are divided into seven classes, viz., 1, national roads; 2, departmental roads; 3, main traffic roads; 4, roads of common interest; 5, ordinary local roads; 6, country roads, recognized and not recognized, and 7, streets. The first two classes constitute the main roads (*grande voirie*), and the five others the lesser roads (*petite voirie*).

Under the present condition of things the departmental roads are gradually being absorbed into the main traffic roads and the roads of common interest, which, however, are controlled in about the same way with the exception only of certain proceedings.

Since the national roads are the property of the state, their classification is vested in the state, and, when they are declared to be of public utility by a decree of the Council of State, they are established and maintained at the expense of the federal treasury. They are controlled by the Minister of Public Works and work on them is performed by the engineers of bridges and highways. In January, 1911, the extent of the national roads was 23,760 miles (38,230 kilometers) which were, in that year, being maintained at the expenditure of \$6,501,205 (33,685,000 francs).

The Councils General have control over the next three classes of French roads, including the departmental roads, the main traffic roads and the roads of common interest. The departmental roads belong to the departments and are maintained at their expense, while the local roads are the property of the communes and are maintained by them. Departmental roads are authorized by state decrees declaring their practical need, but main traffic roads and roads of common interest require only the authority of the Council General.

All of these kinds of roads are under the jurisdiction of the prefects, who are represented in the actual work by highway overseers (*agents-voyers*), though the local road service is at present maintained by the federal engineers of bridges and highways in 44 departments. Within the past 42 years the number of departments which have thus come under the federal control has increased by 17. In other words the length of the departmental roads, which was about 12,430 miles (about 20,000 kilometers) in 1811

and about 19,615 miles (about 31,561 kilometers) in 1869 has been reduced in the most recent census to about 8,142 miles (13,100 kilometers). On the other hand the total length of local roads of all descriptions, which was about 341,765 miles (about 549,900 kilometers) in 1868, had increased to 395,633 miles (636,373 kilometers) on January 1, 1911.

Between the years 1868 and 1911, the total development of classified roads increased 53,805 miles (86,572 kilometers), while the length of roads constructed and opened up for traffic is greater now by 136,136 miles (219,043 kilometers). Moreover in the same period of time 21,131 miles (34,000 kilometers) were removed from the classification of departmental roads. During the year 1910 the maintenance charges for all classes of local roads amounted to \$37,537,018 (194,492,321 francs).

The fundamental law which governs the network of local roads was passed on May 21, 1836. By its provisions the municipal councils are authorized to require for the maintenance of local roads, in case the ordinary funds of the commune are insufficient, three days of taxes in kind or not more than 5 per cent. in addition to the principal of the four general taxes, or both.

Every inhabitant on the direct tax list is required to pay taxes as follows: 1st, for himself and for each man between the ages of 18 and 60 years who is a member of his family or a servant and who resides in the commune; 2d, for each cart or carriage, for each beast of burden and draft and saddle animal in the service of the family. The tax may be paid in money according to rates fixed by the General Council or paid in labor according to rates fixed by the Municipal Council. The general councils may divide the taxes, both cash and labor, between the main traffic roads and the roads of common interest. This is being done more and more frequently because of the increase in the mileage of these roads, and the consequence is that the greater part, sometimes the whole, of the resources created by the law of 1836 is absorbed by the departments and nothing or not enough is left to the communes for the maintenance and improvement of the ordinary local roads. Nevertheless, while new legislation is needed on this point, excellent results have been produced for a long time in the development of the secondary road system of the country.

The provisions of the law of May 21, 1836, concerning the use of local roads by heavy enterprises, such

*Paper presented at the American Road Congress, Atlantic City, N. J., Sept. 30-Oct. 5, 1912.

†Engineer in Chief of Bridges and Highways, of France.

as mines, forests, quarries, etc., and the subsequent payment of extra taxes in labor or money for damages caused by such heavy works have also been of great assistance in keeping the condition of the roads at a high standard. It has not been easy, however, to settle some of the points brought up by this law, for example, just when the traffic becomes extraordinary so as to fit into the category that should be taxed by extra payments, and again the amount of taxes to be collected. For this latter point the practice has grown up of considering, first, the state of the road before the beginning of the work; second, the number of draft animals used by the exploiters; third, the weight of the materials transported; fourth, their nature; fifth, the kind of conveyances and the method of loading them; sixth, the distances passed over, and seventh, the season of the year during which the transportations are made.

But it must not be forgotten that the roads may be used normally and that, besides the extraordinary wear and tear produced by special enterprises, there is the ordinary wear caused by general traffic. The difference is to be noted only at the moment that the traffic is taking place. The simplest means of settling the difficulty is always to make a reduced advance payment whenever agreement can be reached between the government and the individual engaged in the business. In general a price is fixed per kilometer ton, but in the departments near Paris these tolls vary from .8 ct. to 1.2 cts. per kilometer ton according to the nature of the commodities transported. Formerly the valuation was obligatory, but since the law of July 22, 1889, it is no longer required and must be demanded by one of the parties.

In spite of the difficulties arising under application of parts at least of the law of May 21, 1836, the arrangement for paying for these improvements has given and still gives the greatest help in maintaining the local roads of France. It strikes directly the person using the road and causing the extra wear and tear, and creates special resources for restoring the road to its previous good condition. It has contributed largely in the maintenance of roads which each year are damaged by industrial enterprises, as for example, the transportation of crops in the autumn when the roads are in a soft condition because of the rains. The communes would be utterly unable to make these heavy annual repairs without this extra assistance.

It is necessary to mention the fact also that various laws promulgated at different times since 1836 empower the departments to assist in the maintenance of the main traffic roads and the roads of common interest. This assistance can be given only in the case of roads specifically named in the text of legislative acts. Moreover, the departments can intervene only when assurance is given by the communes that the usual maintenance will be given to their ordinary local roads, and that all their available funds will be applied to the works in question. The poorer departments are favored by the state under such circumstances.

Until this year the fact that the state could assist the departments and communes only on their local roads offered serious inconvenience owing to the development of the tourist traffic, especially automobiles in the last few years. Roads which formerly were but rarely used in the transportation of agricultural produce, especially mountain roads, are now used during the touring season by great numbers of automobiles. These roads have thus acquired a general interest, but the departments and communes did not have available the funds required by the increase of traffic and consequently Parliament has passed an act by which assistance for maintaining tourist roads may be given from the federal treasury.

With this purpose in mind the National Bureau of Tourist Traffic has this year undertaken a census of all classes of vehicles on certain roads in order to establish the respective amounts of local and tourist traffic.

Country roads, in spite of their great mileage, are of less importance than the other classes of roads because they serve only the local needs. Their maintenance is, like that of city streets, entirely dependent on the communes.

One other feature of French legislation is to be found in the syndic associations, which are authorized by various laws, for the purpose, among other things, of maintaining, establishing and widening roads. It does not appear, however, that many of these organizations have turned their attention to roads. According to the statistics of 1901, the latest available, less than 300 out of 7,000, have taken up highway work. The organization is very similar to the drainage associations existing in the central and western states of the United States, except that these latter are confined to the one purpose. In France there are two kinds of organizations—the free organizations, which are formed only by the unanimous consent of the persons interested, and the authorized organizations formed by a decree of the prefect, either by change from free organizations or directly.

In the case of the authorized organizations the majority always rules. The landowners interested are united in an authorized syndic association by a decree of the prefect either at the request of one or more among them, or upon the initiative of the "maire" or the prefect, when the road work has been recognized to be of public utility by a decree of the Council of State. This work cannot start without the authorization of the prefect and this may be given only in case three-quarters of the persons interested, representing more than two-thirds of the land and paying more than two-thirds of the land tax, or two-thirds of the persons interested, representing more than three-fourths of the land and paying more than three-fourths of the land tax, join in the association. The prefect may also not give his authorization until after the payment of the costs of condemnation and the guarantee by the organization that all expenses incidental to the work will be paid. In case of the insolvency of the organization the persons who have suffered loss have recourse against the government which has benefited by the works, whether it be commune, department or the state.

The syndics or directors of the enterprise are elected by the members of the association, but in case of a subsidy by the state, the department, the commune or a chamber of commerce, the prefect, the departmental commission, the municipal council, or the chamber of commerce, according to the circumstances, is granted the right to nominate a number of syndics according to the part that the subsidy represents in the entire amount appropriated for the enterprise. These organizations have been placed on a better basis by the law of March 9, 1894, but various laws even as far back as before the Revolution, were passed dealing with certain phases of the plan. As has been said, these organizations have not, up to the present time, been the means, to any great extent, of improving the public roads, but there are great possibilities in such associations. In France the fact that the roads have been so thoroughly improved by the authorities is very likely the reason why no more such work has been done by the syndic associations. In the absence of central road work by the federal government and by some of the states of the United States, the information concerning these organizations is offered as possibly containing suggestions for securing road improvements in those states which have failed to secure it otherwise.

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THE JOINT ROAD CONGRESS AT ATLANTIC CITY

The recent road congress held at Atlantic City, N. J., furnished abundant proof of the contention made in these columns in the issue of September 7 that "The good roads movement, so called, has two distinct sides—the popular and the technical—and efforts to combine the consideration of the two in the sessions of a single convention are never attended by satisfactory results."

Readers of "Good Roads" will recall that in the correspondence columns of that issue there was published a letter from Harold Parker, formerly president of the American Road Builders' Association, calling attention to the apparent confusion in some quarters regarding the purposes and meaning of the two road conventions that were to come—those of the American Association for Highway Improvement and allied organizations at Atlantic City in October, and the American Road Builders' Association at Cincinnati in December. It was in commenting editorially upon this letter that the statement quoted above was made, after

calling attention to the stated policy of the American Association for Highway Improvement—now known as the American Highway Association—and expressing doubt as to whether or not an organization committed to such a policy could successfully undertake, in addition, the functions of a technical society.

Despite the very wide publicity given to the advance notices of the plans of the congress by its press agent, the attendance was much smaller than had been anticipated even by those most doubtful of the success of the undertaking. Estimates of the attendance have been variously placed at from 700, which is probably low, to 1,600, which is probably high, and the only official information which "Good Roads" has been able to obtain is the statement that the registration was "about 1,300." Assuming 1,300 to be correct—although "about 1,300" undoubtedly means less rather than more than that number—the total registration would then be less by 161, or about 11 per cent, than that at the Rochester convention of the American Road Builders' Association last fall, notwithstanding the fact that the Rochester convention was a meeting of actual road builders at which the registration was not swelled by the presence of others. These figures as to registration, taken together with the fact that of the total attendance at Atlantic City only a part consisted of people actually engaged in road work, should go far to correct the false impression given by some supposedly sober and unbiased technical journals that the congress was attended by "more highway officials of high rank than had ever attended a single road congress before" or that it "more than fulfilled the expectations of those who have been working to bring together at a single convention everybody interested in the rational use of the enormous sums of money appropriated annually for highway improvement."

All of the factors determining the success or failure of any road convention should be taken into consideration in making an estimate of what was accomplished by the Atlantic City meeting. Road conventions, in connection with which exhibitions of machinery and material have been held, have succeeded because they gave to people attending them those benefits which they expected to secure. Road builders, including officials, engineers, contractors and others actually engaged in the work, go to such meetings for the knowledge which they may gain and for the opportunity to inspect, under the most favorable conditions, the equipment and materials with which they have to work. Exhibitors have found such gatherings valuable because of the opportunity afforded them to bring before buyers or prospective buyers the products which they have for sale. The real value to both these classes is directly proportional to the number of actual road builders present, and neither the road builder nor the exhibitor has anything to gain from an attendance enlarged by the presence of those not engaged either directly or indirectly in such work—the official, the engineer or the contractor, because those others have no information to impart as to methods of road or street construction or maintenance, and the exhibitor because only the actual road builders are in the market for road machinery or material. For these reasons, it is difficult to see what advantage an organization of actual road builders can hope to obtain by affiliation with other interests in the holding of a convention.

Looking at the matter from another angle, it is not apparent what good results can be expected from injecting the propaganda feature into a national convention at which a part of the attendance consists of road builders and the remainder of so-called "good roads advocates" of various kinds. Good roads propaganda is doubtless still necessary, but there are more effective ways of carrying it on; certainly the place for it is not in a gathering of people whose very presence proves that they believe in the movement and so need not to be exhorted. Pleas for greater activity and larger expenditures in road betterment should be made

to those who need conversion, and as a rule these will not be found at road conventions—surely not at meetings primarily for men directly or indirectly connected with highway work.

At the Atlantic City congress the benefits derived by both road builders and exhibitors were not what they should have been. Two factors were largely responsible for this. In the first place, the attendance, as previously noted, was not up to the expectations of the promoters. This was partly due to the fact that the congress was held at a time of year when neither engineers nor contractors could reasonably be expected to take time from their work to attend a convention. In the second place, the program was both unduly long and poorly arranged. The length of the program made it impossible to devote any considerable amount of time to discussion, which is usually of more real value than the presentation of set papers, and the allotment of subjects to speakers who were not present necessitated the entire omission of any consideration of a number of the subjects scheduled. The arrangement of the program was such that the papers of the most practical value and interest to road builders were scheduled for the last two days—Friday and Saturday. Though some of the papers presented on those two days were of unusual merit, both interest and attendance had so materially dwindled by Saturday morning that instead of holding two sessions and presenting eleven set papers with formal and informal discussions on each, only one session was held, at which five of the scheduled papers were read, little discussion took place, and one paper, the last on the program, was presented, by title only, before an audience of less than a dozen.

The discussion of the Atlantic City road congress should not be closed without correcting the false impression which may have been created in some quarters by an editorial in the "Engineering Record" for Sept. 28. That article, after making the statements that the congress would bring together the experts who have made a scientific study of road building and that "The original plans were developed jointly by the four national organizations representing those who foot the bills, the builders, the users and the material and machinery manufacturers," stated that later the road builders' organization (the American Road Builders' Association) decided to withdraw. Then characterizing as "unfortunate" the failure of these organizations to hold together and concentrate their efforts, it goes on to say: "However, the gap left by the withdrawal of the road builders' association was taken by a number of its leading members and other prominent specialists so that no change in the congress program originally announced has been necessary." The inference naturally drawn is that the American Road Builders' Association withdrew from participation in the Atlantic City congress after the program had been made up, thus leaving gaps which had to be filled. No such situation was created, since the American Road Builders' Association withdrew—or, more properly, declined to affiliate—before anything but the most tentative and indefinite plans had been made.

The exhibition at the Atlantic City congress was creditable, although not by any means the most complete exhibition of its kind ever held anywhere in the world, as claimed by the still active press agent of the American Highway Association. Such conversation as was held with exhibitors at the convention revealed anything but the universal satisfaction reported editorially in a recent issue of the technical journal previously referred to. The exhibitors had been promised an attendance of road builders that would warrant expensive and elaborate exhibits, and few expressed themselves as satisfied with results. It is to be regretted that the money and effort expended by them in making the fine displays which some of them did, should not have brought greater returns.

JUSTIFIABLE EXPENDITURES FOR ROAD IMPROVEMENT AND THE DISTRIBUTION OF THE COST

In planning road improvement work—on either a small or a large scale—among the first matters to be considered should be the amount of money which may justifiably be expended for the improvement of a certain road or certain roads, and the manner in which the cost of the improvement is to be distributed. Unfortunately, the question of whether or not a road should be improved at all, and, if it is to be improved, how extensive the improvement should be, is too often settled without reference to the economic phase of the question. Similarly, the distribution of the cost is fixed by laws enacted with regard to expediency only or at a time when traffic conditions were very different from what they are at present.

All traffic passing over the roads of the country can be divided into two classes—business traffic and pleasure traffic. Certain special roads are used only for one or the other, but in general any given road carries both. On different roads the proportions of the two will vary, and in undertaking improvements due weight must be given to this factor.

The general rule may be laid down that the justifiable expenditure in a given case will be limited by the benefits which the improvement will confer. This statement may appear axiomatic and unnecessary, but it is a fact that expenditures for road improvement have often been made far in excess of any benefits accruing or that could reasonably be expected to accrue. It is our purpose here not to take up in detail methods of determining this amount, but to merely call attention to the necessity of a careful investigation of the amount and nature of traffic before improvement and of the traffic expected after improvement, the reduction likely to be effected in the cost of transportation, and the numerous other factors bearing on any given case.

Though the problem of ascertaining the justifiable expenditure is complex, that of determining upon an equitable distribution of the cost is probably still more difficult of solution. It is also probable that disagreement as to how the cost of road improvement should be distributed has been one of the greatest obstacles encountered in the efforts to secure more extensive road betterment. There would seem to be no question but that the cost should be borne by those who benefit by the improvements, and this view is pretty generally accepted. But in practice there is difficulty in determining who are the beneficiaries. The farmer displays a not unnatural disinclination to pay for roads for the automobile tourist's use, and the automobilist is apt to insist that the money which the state exacts from him in registration fees and other ways should be expended in the construction of trunk lines rather than in the building of radial market roads. Though such opposing views appear reasonable at first, they are both incorrect to a certain extent. Some benefit—indirect, perhaps, but nevertheless real—is derived by the general public from the construction of automobile roads, and an even more apparent and possibly less indirect benefit comes to the automobilist through the improvement of market roads. It is fair, therefore, that each of these two classes of road users should bear some portion of the cost of improving roads of all kinds, and, as a matter of fact, under the existing highway laws, each one does. It is doubtless true, however, that in most cases the cost is not apportioned in anything like a direct ratio to the benefits conferred nor even as nearly in accordance with such a ratio as it would be possible to distribute it.

Before the citizens of this country can be expected to sanction the expenditures which the advocates of wholesale and expensive road improvements are demanding, it would be well for those in authority to plan for the selec-

tion of the roads to be improved in accordance with economic principles and to devise a scheme for the more nearly equitable apportionment of the cost of the work. These two points should receive particularly careful consideration before the launching of schemes for the building of long trunk lines or for the utilization of funds from the federal treasury in the construction and maintenance of roads.

American Good Roads Congress and Ninth Annual Convention of the American Road Builders' Association

Plans for the American Good Roads Congress and ninth annual convention of the American Road Builders' Association, which will be held in Music Hall, Cincinnati, Ohio, on December 3, 4, 5 and 6, are rapidly approaching completion. A tentative program has been prepared; a large portion of the exhibit space has been allotted; many states have signified their intention of making exhibits, and many of the minor details of arranging for what will undoubtedly be the biggest and most important road meeting ever held in this country have been provided for.

At the last convention of the American Road Builders' Association, which was held in Rochester, N. Y., last November, a radical departure from the usual procedure at road conventions was made. Abandoning the custom which had prevailed until that time in preparing the programs of many road conventions, those in charge of the arrangements designated certain sessions for the consideration of specified subjects, made a careful selection of speakers to present them, selected others to present formal discussions, and arranged for devoting the remainder of the time to open discussion by the delegates. By this plan, the number of papers was very materially reduced, the presentation of more than one paper on a single phase of any particular question was obviated and a program was secured comprising a logical and orderly presentation of the various subdivisions of the general subjects of organization, construction and maintenance. The plan worked out even better than had been anticipated, and contributed, as largely as any other one factor, to the unprecedented success of the Rochester meeting.

A similar plan has been adopted for the Cincinnati convention. As before, each session, or each day, will be set aside for the consideration of some particular phase of the general subject, and after the presentation of each paper ample opportunity and time will be available for its discussion. The speakers have been selected by the president of the association, Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of New York City, and his associates on the arrangement committee, with particular reference to their familiarity with the subjects which they are to treat, and although the subdivision of the program according to topics and the exact order in which the several papers will be presented have not been finally determined, it is certain that this arrangement will be such as to provide ample opportunity for the consideration of each of the different questions in an orderly and logical sequence.

The first session of the convention, on Tuesday morning, Dec. 3, will probably be devoted almost entirely to the usual addresses of welcome and responses, and to a presidential address by Mr. Lewis. Six of the seven remaining sessions will be used for the presentation and discussion of technical papers, and one session, the date of which has not yet been finally decided upon, to a business meeting of the American Road Builders' Association. The universal satisfaction manifested last year with the designation of one day as "contractors' day" has resulted in the decision to repeat that feature at Cincinnati, and in the final arrangement of the program one or two sessions will be

allotted to the consideration of matters of peculiar interest to the contractor. It is probable, too, that an evening session will be devoted to illustrated lectures. Definite arrangements for this and for inspection trips, evening entertainments and other features incidental to the congress have not been decided upon.

The technical papers already scheduled will cover the general questions of organization, construction and maintenance. The first of these—organization—will be considered in three papers, each of which will take up a particular division of the subject. The organization of a state highway department will be treated in a paper by Major W. W. Crosby, Consulting Engineer of the Maryland State Roads Commission, who, as chief engineer of that commission, did much to develop its present efficient organization. The organization of a highway department in a large city will be explained by Wm. H. Connell, Chief of the Bureau of Highways of Philadelphia, Pa., who, before his appointment to that position, was Assistant Commissioner of Public Works of the Borough of the Bronx, New York City. The third paper will treat of the organization of a highway department of a small city or a large town. The author will be announced later.

Topics of especial interest to contractors will be presented in a paper on the problems of the road contractor by Hugh Murphy, a well-known public works contractor of Omaha, Neb., and in a paper on plant equipment by F. E. Ellis, Manager of the Essex Trap Rock & Construction Co., an experienced road contractor of Peabody, Mass.

The subject of bituminous pavements for cities will be discussed in a paper by Geo. W. Tillson, Consulting Engineer of the Borough of Brooklyn, N. Y., an engineer of many years' experience in the construction of pavements in New York City, where the problems confronting the engineers are as complex as anywhere in the world. Ellis R. Dutton, Assistant City Engineer of Minneapolis, Minn., will describe the construction of wood block pavements in that city, where lately this class of work has been done by the city itself by day labor, and Robert C. Terrell, recently appointed State Commissioner of Public Roads of Kentucky, will present a paper on earth and gravel roads. Stone and brick pavements will be considered in a paper by an especially selected authority, as will also the subject of the development of a plan for a state or county road system.

Three papers on questions of the utmost importance in connection with the construction of roads or pavements of any kind will be presented by Col. Wm. D. Sohler, Chairman of the Massachusetts State Highway Commission; Clifford Richardson, Consulting Engineer, New York City, and Arthur S. Lewis, Secretary and Superintendent, Lincoln Park Commission, Chicago, Ill. Col. Sohler, who, as a member, and later as the chairman, of the Massachusetts State Highway Commission, has devoted a great deal of attention to the collection and comparison of traffic records, will present a paper on the importance of the traffic census as a preliminary study in the preparation of a road improvement program; Mr. Richardson, who is one of the foremost authorities on asphalts, asphalt pavements and paving and road work in general, will present a paper on the economics of road and paving construction, and Mr. Lewis, whose work in the building of the boulevards of the Lincoln Park system has attracted considerable attention, will discuss the value and importance of cost data. Besides these papers, it is expected that there will be two or three others which will deal with recent work of especial interest or with general questions of particular importance to road builders.

The exhibition feature, which has proven a most valuable and interesting adjunct at the last three conventions of the American Road Builders' Association, gives promise of possessing those qualities to an even greater degree this

year than before. A large part of the space available for exhibits at Cincinnati has already been allotted to exhibitors and many other manufacturers and dealers, who have not yet definitely contracted for space, have signified their intention to exhibit, so that the officials of the association are confident that the Cincinnati exhibition will comprise a more extensive and varied display of road machinery and materials than even the one at Rochester, which easily surpassed any previous one.

An additional exhibition feature has been provided this year in the form of exhibits by various states and cities. These will illustrate by photographs, maps, plans, samples of local materials, cross sections of standard types of roads and the like, the road systems of the different states, the progress being made and the methods employed. From those in charge and from literature which will be distributed, visitors can secure definite and accurate information as to what is being done in different localities, and from the magnificent collections of photographs possessed by some of the states a graphic conception of the work being done throughout the country can be obtained. At the present writing, it is practically assured that Illinois, Kansas, Kentucky, Minnesota, New Jersey, New York, North Carolina, Ohio, South Carolina, Tennessee and Virginia will have exhibits, the majority of them having made definite arrangements to do so. Besides these, many others have made tentative plans to have displays at the exhibition, and in the weeks remaining before the opening of the convention it is expected that the majority of the states, at least those in which road work is supervised by well-organized central authorities, will make definite arrangements for exhibiting.

Cincinnati, a popular convention city, is admirably adapted to the holding of a road convention. It is not far from the center of population and is within easy reach of most of the principal cities of the country. Music Hall, in which the convention and exhibition will be held, is conveniently situated and offers every facility as a meeting place and exhibition hall. The city is abundantly supplied with hotels, which will provide ample accommodations at reasonable rates, the hotel keepers, through their association, having assured the management of the congress that no advance in rates will be made. No effort is being spared by either the American Road Builders' Association or the officials and citizens of Cincinnati to provide for the comfort and convenience of delegates. The excellent facilities afforded by Cincinnati, the demand for exhibition space and the general interest taken by road builders throughout the country—as indicated by the numbers who have signified their intention of being present—make it certain that the Cincinnati congress will be the most important gathering of road builders ever held in America.

Annual Meeting of the American Highway Association

The annual business meeting of the American Highway Association was held in the Greek Temple, Young's Million Dollar Pier, Atlantic City, N. J., on Thursday evening, October 3, 1912, the principal business of the meeting being the changing of the name from the American Association for Highway Improvement to the American Highway Association, the election of officers for the coming year and the adoption of a resolution relative to federal aid.

The officers elected were as follows: President, Logan Waller Page, Director of the U. S. Office of Public Roads; Vice President, W. W. Finley, President of the Southern Railway Co.; Treasurer, Lee McClung, Treasurer of the United States; Secretary, J. E. Pennybacker, Jr.; Field Secretary, Charles P. Light.

Practically the entire meeting, with the exception of the time required for the election of officers and the reading of the reports of the secretary and other officers, was occupied by a discussion on federal aid. Several resolutions placing the association on record as favoring federal aid were offered, discussed and either voted down or laid on the table. Finally the following resolution, offered by J. W. Howard, of New York City, was passed:

"Resolved, That this association looks with favor upon the investigation by the present joint committee of Congress for giving federal aid in the construction, reconstruction and maintenance of highways in the United States, and pledges itself to cooperate with and assist that committee in every way possible toward an early decision and the preparation of and the presentation to Congress of an appropriation bill looking to the immediate or ultimate granting of federal aid for highways for vehicle traffic."

Annual Meeting of the Quebec-Miami International Highway Association

The annual meeting of the Quebec-Miami International Highway Association was held at the Marlborough-Blenheim Hotel, Atlantic City, N. J., on Thursday, October 3, 1912.

The principal business of the meeting was the reception of reports from each of the provinces and states through which the road passes, and the election of officers. The reports indicated, according to President Hadley, the completion of the entire road before the end of 1914.

Officers were elected for the coming year as follows: President, Howard D. Hadley, Plattsburg, N. Y.; First Vice President, Geo. A. Simard, Montreal, P. Q.; Secretary, Norman N. Parrott, Baltimore, Md., and Treasurer, Leonard Tufts, Pinehurst, N. C.

Annual Meeting of the National Association of Road Machinery and Material Manufacturers

The annual meeting of the National Association of Road Machinery and Material Manufacturers was held at Atlantic City, N. J., during the American Road Congress, on the afternoon of Thursday, October 3, 1912. W. T. Beatty, President and General Manager of the Austin-Western Co., Ltd., presided.

The principal business consisted of the reception and acceptance of the report of the treasurer, the appointment of various committees and the election of officers for the coming year. The committees appointed were: A membership committee, consisting of C. P. Price, of the American Tar Company; Nat Tyler, Jr., of the Good Roads Machinery Company, and J. S. Robeson, of the Robeson Process Company; a committee for the enlargement of the scope of the association's work in the removal of the evils arising from indiscriminate company bonding, for securing better protection for the machinery and material companies and for such other work along similar lines as should be deemed desirable, consisting of C. W. Bayliss, of the Barber Asphalt Paving Co.; A. A. Kessler, of the Watson Wagon Co., and W. H. Kershaw, of the Texas Co.; a program and entertainment committee to be appointed by the president and a conciliation committee also to be appointed by the president. This last mentioned committee was appointed after discussing the action taken by the American Road Builders' Association last spring in declining to affiliate with the American Highway Association, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers in the holding of a joint congress. It was appointed for the purpose of attempting to bring about cooperation of the American Road Builders' Association with the other organizations.

Officers for the coming year were elected as follows: President, W. T. Beatty, of the Austin-Western Co., Ltd.; Vice President, Henry Fisher, of the Standard Oil Co.; Secretary-Treasurer, Daniel T. Pierce, of the McGraw Publishing Co. Directors: W. T. Beatty, Henry Fisher, S. Jones Phillips, Nat Tyler, Jr., B. C. Hvass, H. P. Goodling, A. A. Kessler, E. Louis Kuhns, C. J. Farney, Chas. P. Price, C. W. Bayliss, R. K. Pierce, J. S. Robeson, B. F. Affleck, Thos. M. Roche, W. H. Kershaw and John M. Landenberger.

Dinner Given by Colonel Sohler

Colonel William D. Sohler, Chairman of the Massachusetts State Highway Commission, the presiding officer at the Legislative Section of the American Road Congress on Wednesday afternoon, October 2, gave a dinner that evening at the Marlborough-Blenheim Hotel, Atlantic City, to a number of the delegates present at the congress. The dinner was in honor of M. de Pulligny, Engineer in Chief of Bridges and Highways of France, who was one of the speakers at the forenoon session.

Besides M. de Pulligny and Col. Sohler, there were present Max Adler, Chairman of the Permanent Paving Commission of New Haven, Conn.; Geo. W. Cooley, State Engineer of Minnesota; A. W. Dean, Chief Engineer of the Massachusetts State Highway Commission; S. Percy Hooker, State Superintendent of Highways of New Hampshire; A. N. Johnson, State Highway Engineer of Illinois; W. S. Keller, State Highway Engineer of Alabama; Jesse Taylor, Secretary of the Ohio Good Roads Federation; C. A. Kenyon, President of the Indiana Good Roads Association; Gervais Lombard, Acting State Highway Engineer of Louisiana; James H. MacDonald, State Highway Commissioner of Connecticut; James Owen, County Engineer of Essex County, New Jersey; Logan Waller Page, Director of the United States Office of Public Roads; D. T. Pierce, McGraw Publishing Co., New York City; E. L. Powers, Editor of "Good Roads;" Chas. P. Price, Manager of the American Tar Co., Malden, Mass.; Clifford Richardson, New York City; Col. E. A. Stevens, Commissioner of Public Roads of New Jersey; H. B. Varner, Editor of "Southern Good Roads;" Frederick E. Wadhams, Albany, N. Y., and P. St. J. Wilson, State Highway Commissioner of Virginia.

Ohio Bond Issue Proposed by Jacob S. Coxey

The plan proposed by Jacob S. Coxey, of Massillon, Ohio, for a bond issue of not more than \$100,000,000 to provide funds for road improvement in Ohio, to which reference is made in the report of the Atlantic City road convention in connection with the address made by Mr. Coxey at the forenoon session on Thursday, provides for an amendment to the constitution through an initiative petition. This petition, which Mr. Coxey began circulating at the Atlantic City road congress, provides for the amendment of the constitution as follows:

"Section 1. The state may contract debts to supply casual deficits or failures in revenues, or to meet expenses not otherwise provided for; but the aggregate amount of such debts, direct and contingent, whether contracted by one or more acts of the General Assembly, or at different periods of time, shall never exceed seven hundred and fifty thousand dollars; and the money arising from the creation of such debts shall be applied to the purpose for which it was obtained, or to repay the debts so contracted, and to no other purpose whatever; provided, however, that laws may be passed to contract debts and authorize an issue of bonds to an amount which shall not exceed one hundred million dollars, in denominations of \$1, \$2, \$5, \$10, \$20,

\$50 and \$100 each, bearing interest not to exceed one-half of one per cent. per annum for the purpose of constructing, rebuilding, improving and repairing a system of State, Inter-County, Township and Village wagon roads throughout the State. Said bonds shall be exempt from taxation and be held as legal reserves of banks organized under the laws of the State of Ohio.

"There shall be levied and collected annually by taxation, an amount sufficient to pay the interest of one-half of one per cent. per annum and to redeem said bonds at the rate of four million dollars per annum; said bonds shall be receivable in payment of State, County, Township, Municipal and Village taxes, and shall likewise be receivable in payment of private obligations incurred and payable within the State of Ohio. Laws shall be passed to provide for the maintenance of said roads. Such wagon roads shall be determined under general laws, and the cost of construction, rebuilding, improving, repairing and maintaining the same shall be paid by the State out of this fund. The provisions of this section shall not be limited or controlled by Section 6 of Article XII."

Street Work in Mobile, Alabama

When the work of paving the streets provided for in the eleven paving improvement contracts awarded by the City Commissioner on October 8, is completed, the city of Mobile, Ala., will have 35.8 miles of modern paved streets, or a total of 591,929 sq. yds. of improved street area.

The work of constructing these improved streets commenced in December, 1901, when the first modern pavement was laid in Mobile. The first five pavement improvements entailed upon the city approximately \$375,000 for principal alone. This burden with the interest proved too heavy for the city to carry and necessitated the organization of the present system of charging practically the entire cost of such work against abutting property.

Various materials have been employed by the city for paving various thoroughfares, and in a statement by City Engineer Wright Smith, it is announced that it is next to impossible to designate which material the city has found by experience to be the most satisfactory, the varying conditions in the different localities and the traffic which passes over the streets and other considerations having important bearing upon the class of material most available for that locality. Owing to the absence of suitable natural material in the vicinity of the city, the improvement of the still unpaved streets within the city limits, of which there are many miles, presents a problem that is exceedingly difficult to deal with satisfactorily. Experiments are being made, however, with what local material there is, and as far as can be judged now, the work has proven satisfactory so far.

The number of square yards of the various classes of material which have been used in the city streets is as follows: Asphalt, 122,184 sq. yds.; vitrified brick, 113,296; creosoted wood block, 275,807; granite, 26,627; granitoid or cement, 8,000; bitulithic, 46,015. Total, 591,929.

The high schools of the state of Washington have selected as the subject of their intra-school debates this year the following question: "Resolved, that this state should continue the policy of constructing state roads and permanent highways, with increasing appropriations therefor." For the guidance of participants, the Washington State Library, at Olympia, has prepared a 44-page pamphlet, 3 1/2 by 6 ins. in size, containing a list of references to information on roads to be found in pamphlets, periodicals, state publications and government documents.

Proposed Study of City Planning

The National Conference on City Planning has announced that an especially appointed committee of that organization will this year conduct a study of city planning, taking for the purpose an area on the outskirts of a growing city having a population in the neighborhood of a half million.

As set forth in an announcement prepared by the committee and sent to all members of the organization, the purpose of the study is not that of an ordinary competition undertaken for the purpose of selecting and premiating the design presenting the most praiseworthy solution of the problem in question, but is rather a means of securing the cooperation of a number of workers in preparing and gathering together specific illustrations of the application, under a given set of normal conditions, of various important ideas, principles and devices used in city planning in such a manner as will facilitate a close comparison of the respective advantages and limitations of the designs submitted. Only those at present members of the society or who become members may participate in the study, and an entrance fee of \$5.00 must be paid to go toward defraying the cost of conducting the study. Each entrant, upon payment of the entrance fee, will receive data consisting of a topographical map of the tract selected, with a key map showing its relation to the city; a copy of the Model Housing Law; a copy of the building code recommended by the National Board of Underwriters, of New York, and a circular entitled "Data for Proposed Study in City Planning Undertaken by the National Conference on City Planning." In addition, participants will receive copies of all notices, reports and communications sent out by the committee. It is expected by the committee that in some cases two or more members will collaborate in the preparation of a single plan. The submission of more than one plan by a single member is allowed, and any member may also be a member of more than one group, each of which may submit a plan or plans. Authors of separate plans will also be permitted to consult with each other concerning their respective plans while they are being made, if they see fit to do so, and it will be left to those submitting plans to determine when such consultation amounts to joint authorship. Arrangements have been made to have the participants in the study meet with the members of the committee at the City Club, 55 West 44th St., New York City, for the discussion of plans in progress. The first of these meetings will be held on Nov. 22 of this year and others at times to be announced later. Final plans and descriptions must be presented by Mar. 4, 1913. They will become the property of the National Conference on City Planning and will be exhibited at the next meeting of that organization.

According to an outline of the study prepared by the committee, the tract selected is assumed to contain 500 acres of land and to be situated on the outskirts of a growing city of about 500,000 population, four miles from the center of the city, but entirely within its corporate limits. The rate and direction of the city's growth are assumed to be such that when the tract is fully developed it will have been absorbed by the demand for building sites within a reasonably short period and at prices large enough to repay an original investment in the land amounting to \$2,500 an acre, together with the cost of development, interest, taxes, selling costs and a fair profit. It is further assumed that the demand will be mainly for the erection of dwellings and such other structures as are normally to be expected under the given conditions, viz., retail stores, places of amusement, schools, churches, etc. In order to avoid discrepancies in legal conditions, it is assumed that the development of private property will be governed by

the provisions of the building code approved by the National Board of Fire Underwriters and the Model Tenement House Law modified to a housing law. The general plan, according to the specifications, should include (1) the location of streets and other proposed public properties, (2) the development of private land in harmony with the general plan and under such control as could be exercised by ordinance or statute under the most favorable constitutional limitations in the United States and (3) the recognition of any control that might reasonably be expected to be exercised by restrictions embodied in deeds given by public spirited land companies or other owners of real estate.

The special committee consists of the following: John Nolen, Chairman, Harvard Square, Cambridge, Mass.; B. A. Haldeman, Bureau of Surveys, City Hall, Philadelphia, Pa.; George B. Ford, 347 Fifth Ave., New York City; John M. Demarest, 47 W. 34th St., New York City, and John Ihlder, Secretary, 105 East 22nd St., New York City. Detailed information in regard to the study may be obtained from Flavel Shurtleff, Secretary of the National Conference on City Planning, 19 Congress St., Boston, Mass.

State Road Work in Pennsylvania

Over 4,700 miles of state highways in Pennsylvania have been repaired and put in good condition since they came under the state jurisdiction in June of this year. Practically all of this work was done in three months, considerable time being required by the State Highway Department to get its repair work under way. It was not until July 1 that systematic operations were possible.

One of the first things accomplished was the elimination of the old-fashioned water breaks which used to be a serious impediment to travel throughout the state. All these have been removed and it is stated that there is not one left on the 4,700 miles of roads which have received the attention of the state department.

Next in importance has been the work of ditching underdraining, the removal of underbrush and overhanging bushes at the roadsides in order to allow the roads to dry up quickly after rains, and the recrowning of the road surfaces. Most of the work has been done with the materials at hand, although in some instances macadam construction has been used. All of these roads will be gone over again before the winter sets in, the present work being, to a considerable extent, of a temporary character designed to keep the main highways in the best possible condition until the money to be derived from the proposed \$50,000,000 bond issue shall provide funds for the more thorough repair of the highways.

New Mexico State Good Roads Association Formed

At a meeting of those interested in good roads in Albuquerque, N. M., October 11, the New Mexico State Good Roads Association was organized. The meeting was opened by an address on the object of the meeting by R. E. Twitcheil, of Albuquerque, who spoke on the proper methods of educating the people to the necessity of good roads, and the great good to be derived from highway improvement. Other addresses were made by Francis E. Lester of Mesilla Park, Senator Thomas B. Catron, Governor McDonald, Col. Dell M. Potter and Dr. Garrison.

The thirty-second annual session of the Farmers' National Congress will be held at New Orleans, La., November 7-12, 1912, the first session being held in the Progressive Union Building, St. Charles and Common Streets, at 2 p. m., Nov. 7. Among the measures advocated by this organization is liberal federal aid for good roads.

Coming Meetings

Nov. 12-15.—American Society of Municipal Improvements. — Annual Convention, Dallas, Tex.—Secy. A. Prescott Folwell, 5 Union Square New York, N. Y.

Nov. 19-22.—American Civic Association.—Annual Convention, Baltimore, Md. Secy., Richard B. Watrous, Union Trust Bldg., Washington, D. C.

Nov. 20-21.—Southern Appalachian Good Roads Association.—Fourth Annual Convention, Atlanta, Ga. Secy., H. B. Varner, Lexington, N. C.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec. 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Personal Notes

Geo. Wright has resigned as City Engineer of London, Ont.

G. W. Bernard has been appointed Assistant City Engineer of New Orleans, La.

Wm. Bodmer, of Wilke-Barre, Pa., has been appointed City Superintendent of Highways for Luzerne County.

S. H. Kimmel has been appointed Road Engineer of Henderson County, Ky. The headquarters will be at Henderson.

Geo. A. Giles has resigned as City Engineer of Binghamton, N. Y., to become Construction and Supervising Engineer for the Binghamton Railway Co.

Walter Wood, formerly Superintendent of Parks for the Chicamauga Park Commission, has assumed active charge of the Bureau of Parks and Buildings of Chattanooga, Tenn.

Arnold G. Chapman has been appointed Deputy State Engineer and Surveyor of New York. Mr. Chapman has been employed for some years as Chief Clerk in the office of the State Engineer and Surveyor.

A. N. Johnson, State Highway Engineer of Illinois, has been appointed one of the nonresident lecturers in the highway engineering course at Columbia University, New York City. Mr. Johnson's subject will be concrete highway bridges.

Morris M. Defrees, of Indianapolis, Ind., died recently at his home in that city. Mr. Defrees, who was 66 years

old at the time of his death, was a contractor on street, bridge and railway work, and was one of the members of the first Board of Public Works of Indianapolis.

General Notes

Mascoutah road in Belleville, Mo., has been raised to an average height of 6 ft. in order to eliminate the danger of floods, 40,000 cu. yds. of earth having been moved during the work.

The City Council of Montreal, P. Q., has voted to request the Legislature to abolish the by-law which makes it incumbent upon proprietors of land to pay the entire cost of permanent paving improvements.

An order has been passed by the City Council of Kingston, Jamaica, authorizing the immediate commencement of the project of replacing the present Cataraqui bridge in that city by a new causeway.

The boulevard bridge spanning the tracks of the C. R. R. of N. J., in the lower section of Bayonne, N. J., which has been closed to traffic for over a year, has just been completed and is open to traffic. It is of steel and concrete construction and cost \$67,000.

An agreement between the city of Providence and the N. Y., N. H. & H. R. R. Co. relative to the abolition of the grade crossing at Plainfield st. and Hartford Ave., in the Olneyville section, has been signed by Charles S. Mellen, President of the railroad company.

The County Commissioners of Portage Co., O., at a recent meeting adopted a resolution to submit to a popular vote on November 5, a proposition to increase the county tax levy two mills each year for five years for the purpose of building county roads. This plan, if sanctioned by the voters, will raise \$90,000 annually.

The Ontario Motor League has announced its intention of following the custom which has been inaugurated in New York state, of designating various highways by colors. In place of the signs now used, the league will have poles, posts and fences throughout the province painted to designate the roads. The road from Windsor, Ont., to Montreal, P. Q., via Toronto, which is the road most frequently used by motorists in the Dominion, will be designated by a blue band.

Trade Notes

"Park Bridges of Reinforced Concrete" is the title of an 8-page pamphlet, 6 by 9 ins. in size, issued by Daniel B. Luten, Consulting Engineer, Indianapolis, Ind. The pamphlet is printed on heavy white paper and contains 8 full page illustrations showing concrete park bridges designed by Mr. Luten for various parks.

"Bitulithe; Chaussee a Grande Resistance sans Boue ni Poussiere" is the title of a 6-in. by 9-in. booklet, consisting of 8 pages and cover, issued by la Societe Francaise pour l'Amelioration des Routes, 1 Rue de Berlin, Paris, France. The booklet is devoted to a description of the bitulithic pavement and of the method of laying it, containing, in addition, statements of the amounts of that pavement laid in various American and French cities.

A demonstration of the use of dynamite for blasting hard ground as a substitute for plowing was made recently before the officials of the Park Department of Los Angeles, Cal., by the Du Pont Powder Co. The demonstration was made at a point where 6 ft. of earth had to be removed to bring the road to grade, and where, by the use of plows, only about 8 ins. of dirt, it is stated, was moved at each plowing, six mules being required on each plow. Thirty holes, 4 ft. apart, were bored to grade, each loaded with two cartridges of dynamite and then fired. It is said that the demonstration was regarded as satisfactory as the earth was loosened to grade and no further plowing was required.

At the Illinois State Fair, held at Springfield, Ill., recently, a concrete road about three-quarters of a mile long which had been started on October 5—two weeks before the opening of the fair—was completed. The pavement begins at the entrance to the State Fair Grounds and runs north along the eastern boundary of the grounds, and was built by the Illinois State Highway Department as a demonstration road. The pavement is 18 ft. wide, 8 ins. thick at the center and 6 ins. thick at the side. Practically all of the cement used in its construction was donated by the Universal Portland Cement Co. This company also showed at the fair moving pictures illustrating the methods employed in the construction of concrete highways in Wayne County, Michigan.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

Date of letting.	Reported issue of.
11-4 Jefferson City, Mo., asphalt mac., concrete curbs & gutters.	10-26
11-5 Bedford, Ind., gravel road.	11-2
11-6 Corydon, Ind., gravel roads.	11-2
11-6 Crawfordsville, Ind., 10 gravel roads.	11-2
11-6 Logansport, Ind., 4 gravel roads.	11-2
11-6 Marion, Ind., gravel roads.	11-2
11-6 New York, N. Y., paving, sidewalks, curbs, etc.	11-2
11-7 Vernon, Ala., gravel road.	10-26
11-7 Crown Point, Ind., gravel roads.	11-2
11-7 Evansville, Ind., grading, draining and paving.	10-26
11-7 Peru, Ind., gravel roads.	11-2
11-7 Jackson, Miss., gravel roads.	11-2
11-7 New York, N. Y., asphaltic concrete paving, etc.	11-2
11-8 New York, N. Y., granite paving, sidewalks, etc.	11-2
11-11 Houston, Tex., bitulithic and wood block paving.	10-26
11-11 Houston, Tex., bitulithic and wood block paving.	11-2
11-12 Indianapolis, Ind., gravel roads.	11-2
11-13 Canton, O., brick paving.	11-2
11-15 Fresno, Cal., oil macadam.	11-2
11-21 Shelbyville, Ind., gravel road.	11-2
11-22 Topeka, Kan., brick paving.	11-2
12-9 Pikeville, Ky., paving.	11-2

BRIDGES

11-5 Auburn, N. Y., steel.	11-2
11-6 Eutaw, Ala., 6 steel.	10-19
11-6 Davenport, Wash., 3 steel.	10-26
11-7 Ventura, Cal., approaches.	10-26
11-7 Carthage, Mo., concrete arch or steel.	11-2
11-8 Fort Smith, Ark., concrete.	10-26
11-8 Little Rock, Ark., concrete steel viaduct.	10-26
11-8 Chandler, Okla., 43 steel.	10-26
11-9 Wellington, Kan., 3.	11-2
11-11 Montgomery, Ala., 2 steel.	11-2
11-11 Huntsville, Tex., 2 steel.	9-21
11-12 Easton, Md., concrete.	11-2

BONDS

11-7 Hallettsville, Tex., road.	10-19
11-10 McArthur, O., bridge.	11-2
11-10 Eastville, Va., road.	11-2
11-12 North Tonawanda, N. Y., road.	10-26
11-20 Lincoln, Neb., paving.	11-2
11-20 Cincinnati, O., street.	11-2
12-7 Pearsall, Tex., road.	10-19

MISCELLANEOUS

11-6 Boro. of Brooklyn, N. Y. C., furnishing asphalt.	11-2
11-6 Boro. of Brooklyn, N. Y. C., furnishing asphalt sand.	11-2
11-7 Dept. of Bridges, N. Y. C., furnishing lumber.	11-2
11-7 Dept. of Parks, N. Y. C., furnishing broken stone and screenings.	11-2
11-8 Boro. of the Bronx, N. Y. C., street signs.	11-2

ROADS AND STREETS

Bids Asked and Prospective Work

Marion, Ala.—The City Council has decided to pave Washington St. with vitrified brick and asphalt.

Fresno, Cal.—Sealed bids will be received by the Bd. of Spvrs. of Fresno, Cal., until Nov. 15, for the construction of oil macadam pavement on Maroa, University and Van Ness Aves. D. M. Barnwell is City Clerk.

Bedford, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Lawrence Co., until 1 p. m., Nov. 5, for the construction of a gravel road known as part of Bedford and Bloomington Road. Ezra W. Edwards is Co. Auditor.

Corydon, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Harrison Co., until 1 p. m., Nov. 6, for the construction of two gravel and macadam roads in Posey Twp. Wm. Taylor is Co. Auditor.

Crawfordsville, Ind.—Sealed bids will be received by the Bd. of Co. Commrs. of Montgomery Co., until 10 a. m., Nov. 6, for the construction of ten gravel roads. Bennett B. Engle is Co. Auditor.

Crown Point, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Lake Co. until noon, Nov. 7, for the construction of two gravel roads known as the

Wm. C. Caldwell et al road and the Forrest F. Russell et al road. Chas. A. Johnson is Co. Auditor.

Indianapolis, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Marion Co. until 10 a. m., Nov. 12, for the construction of a gravel road in Wayne Twp. W. T. Patten is Co. Auditor.

Logansport, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Cass Co. until 10 a. m., Nov. 6, for the construction of three macadam roads in El Twp.

Sealed bids will be received by the Bds. Co. Commrs. of Cass, Fulton and Pulaski Counties until 10 a. m., Nov. 8, for the construction of a road on the line dividing Cass from Fulton and Pulaski Counties. J. E. Wallace is Auditor of Cass Co.

Marion, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Grant Co. until 2 p. m., Nov. 6, for the construction of gravel roads in Mill, Center and Monroe Twps. E. H. Kimball is Co. Auditor.

Peru, Ind.—Sealed bids will be received by the Bd. Co. Commrs. of Miami Co. until noon, Nov. 7, for the construction of gravel roads in Perry and Union Twps. Frank K. McElheny is Co. Auditor.

Shelbyville, Ind.—Sealed bids will be received by the Bds. Co. Commrs. of Shelby and Johnson Counties until 10 a. m., Nov. 21, for the construction of a gravel road on the line between the two counties.

Topeka, Kan.—Sealed bids will be received Nov. 22 for the construction of $\frac{1}{4}$ mile of brick paving. S. G. Zimmerman is County Clk.

Pikeville, Ky.—Sealed bids will be received by the City Council of Pikeville on the second Monday of December, 1912, for the construction of 25,000 sq. yds. of street paving. The work is to be commenced as early as practicable in the spring of 1913, and completed by Dec. 1 of that year. The work can be done in two or more contracts. Further particulars may be secured from the committee consisting of A. S. Reese, City Clerk, J. S. Kline, City Attorney, Stoney Amick, City Engineer, G. W. Greer, Councilman.

Jackson, Miss.—Sealed bids will be received by the Bd. of Spvrs. of Hinds Co. until Nov. 7, for graveling portions of the road known as Belhaven St. W. W. Downing is clerk of the board.

Sealed bids will be received by the Highway Comm. of the first and fifth districts of Hinds Co. until 10 a. m., Nov. 7, for the construction of gravel roads as follows: Pochahontas extension, 9.7 miles, Clinton and Bolton Road, 5.68 miles. Plans and specifications are on file at the office of the Commission. Geo. W. Sarlls is Engineer of the Commission.

New York, N. Y.—Sealed bids will be received by the Park Bd. at the office of the Dept. of Parks, Arsenal Bldg., 5th Ave. and 64th St., Manhattan, until 3 p. m., Nov. 7, 1912, for furnishing, setting and resetting curbstones, and paving with asphaltic concrete on a concrete foundation the roadway of the plaza at 110th St. and 8th Ave. Blank forms may be obtained and plans inspected at the office of the Dept. of Parks.

Sealed bids will be received by the President of the Borough of Brooklyn at the office of the President, Room 2, Borough Hall, until 11 a. m., Nov. 6, for the following street work: (1) Regulating curbing, grading and laying sidewalks on W. 35th St., between Neptune and Surf Aves., the work to include 2,800 lin. ft. of cement curb, 1-year maintenance, etc. (2) Regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of 45th St., between 14th and 15th Aves., the work to include 2,400 sq. yds. of asphalt pavement with 5-year maintenance, etc. (3) Regulating, grading, curbing and laying sidewalks on 61st St., between 12th and Ft. Hamilton Aves., the work to include 3,200 lin. ft. cement curb with 1-year maintenance; 8,000 sq. ft. cement sidewalks with 1-year maintenance, etc. (4) For constructing cement sidewalks on both sides of Henry St., between W. 9th and Lorraine Sts., where not already done, and on the west side of Coney Island Ave., between Beverley Road and Avenue C, in front of lot 38, block 5361, the work to consist of 8,620 sq. ft. of cement sidewalk with 1-year maintenance etc. Blank forms and further information may be obtained and plans inspected

at the office of the Bureau of Highways, Room 12, Municipal Bldg., Boro. of Brooklyn.

Sealed bids will be received by the President of the Borough of Queens at the office of the President, Borough Hall, 5th St. and Jackson Ave., Long Island City, until 11 a. m., Nov. 8, 1912, for street work as follows: (1) Regulating, grading and repaving with improved granite blocks on a concrete foundation, Grand St., from Flushing Ave. to the main line of the L. I. R. R. (2) Regulating and widening the roadway and repaving with improved granite blocks and with old granite blocks split and redressed on a concrete foundation, Myrtle Ave., from the Brooklyn Borough line to Cooper St. (3) Regulating, grading and laying blue-stone sidewalks in Jackson Ave., between Steinway and Woodside Aves.; 33,500 sq. ft. new flagstone walk, (4) Regulating, grading, curbing and laying sidewalks on the north side of Polk Ave. between Alburtils and Junction Aves., (5) Regulating, grading, curbing and regrading, planing and replanking and laying sidewalks in Graham Ave., from Vernon Ave. to Sherman St., the work to include 8,500 sq. ft. of new flagstone walk, and 3,000 cu. yds. of earth excavation. (6) Regulating, grading, curbing and laying sidewalks in Sherman St., between Ridge St. and Grand Ave., the work to include 3,000 cu. yds. of earth excavation; 3,500 cu. yds. of embankment in excess of excavation; 3,800 lin. ft. of new bluestone curb, and 20,000 sq. ft. of new flagstone sidewalk. (7) Regulating, grading and laying sidewalks where not already laid and in good condition in various streets of the borough, the work to include 26,555 sq. ft. cement sidewalk with one year maintenance. (8) Regulating, grading the sidewalk spaces, curbing and laying sidewalks where not already laid to grade and in good condition in Jackson Ave., between Junction Ave. and 54th St., the work to include 9,000 lin. ft. new bluestone curb and 42,000 sq. ft. cement sidewalk with one year maintenance, etc. (9) Laying sidewalks where not already laid in Broadway, between Hoffman Blvd. and Cornish St., the work to include 4,000 sq. ft. cement sidewalk with one year maintenance, etc. (10) Regulating, grading and laying sidewalks where not already laid and in good condition on the north side of Myrtle Ave., between Onderdonk and Forest Aves., the work to include 520 sq. ft. cement sidewalk with one year maintenance, etc. (11) Regulating, grading, curbing and laying sidewalks and cross walks on Onderdonk Ave., between Wiltoughby Ave. and Elm St., the work to include 5,200 sq. ft. cement curbing and sidewalk with one year maintenance, etc. Blank forms may be obtained and drawings inspected at the office of the President of the Borough of Queens.

Sealed bids will be received by the Commissioner of Bridges at his office, 13-21 Park Row, Manhattan, until 2 p. m., Nov. 7, for the following: Repaving the north approach of the Third Ave. bridge over the Harlem River; repaving the east approach of the Brooklyn Bridge; repaving the approaches of the Pelham Bridge over Eastchester Bay.

Canton, O.—Sealed bids will be received by the Bd. of Co. Commrs. of Stark Co., at the Court House, Canton, until 10 a. m., Wednesday, Nov. 13, for the construction of the West Ely St. and Harrisburg Road improvement in Lexington Twp. The work includes 3,250 cu. yds. of grading, 5,921 lin. ft. of stone or concrete curb, 5,317 sq. yds. 4-in. concrete foundation, 5,317 sq. yds. of 4-in. brick pavement and 247 lin. ft. 6-in. sewer pipe relaid. Plans and specifications are on file at the office of J. H. McConnell, Co. Auditor.

Cincinnati, O.—A resolution providing for the paving of a portion of Vine St. with granite or Medina block, at an estimated cost of \$80,000, has been submitted to the City Council by City Engineer Waite.

Houston, Tex.—Sealed bids will be received at the office of Dan C. Smith, Jr., City Controller and City Secretary, until noon, Nov. 11, for grading and paving the following streets: West Alabama St. from Main St. to the G. H. & S. A. R. R., bitulithic pavement; San Jacinto St. between McGowen Ave. and Eagle St., bitulithic pavement; McGowen Ave. from Crawford St. to the S. A. & A. P. R. R., bitulithic pavement; Travis St. between Leeland

Ave. and McGowen Ave., creosoted wood-black pavement. Plans and specifications are on file at the office of F. L. Dormant, City Engr.

Seattle, Wash.—The Street Committee of the City Council has recommended the paving of Magnolia Bluff Highway, at a cost of \$130,000.

Bids Received and Contracts Awarded

Bakersfield, Cal.—The Bd. Spvrs. has awarded the contract for the construction of ½ mile of asphalt concrete paving, extending from the northern limits of the city to the new concrete bridge over the Kern River, to Thompson Bros. of Fresno, Cal., for \$10,764.80.

Los Angeles, Cal.—Low bids have been received as follows: Seventh St., Walter Overall, brick paving, 34 cts. per sq. ft.; grading and oiling, \$1.95 per lin. ft.; concrete curb, 36 cts. per lin. ft.; concrete sidewalk, 12 cts. per sq. ft. Street improvement and sewer construction on various streets, W. N. Hendricks, regrading, 11 cts., vitrified brick gutter, 52 cts., storm sewer, \$16,500.

Santa Monica, Cal.—The City Council has awarded the contract for the improvement of Fremont Ave. from the ocean to the city limits to the Kaw Pvg. Co. for about \$92,000.

Coeur d'Alene, Idaho.—A contract for the construction of concrete sidewalks has been awarded to the Two Miracle Concrete Co., of Kalispell, Mont., for \$41,661.

Bloomington, Ill.—The Bd. of Local Impts. has awarded the contract for paving Clinton St. between Jefferson and Empire Sts. to I. D. Lain for about \$14,000.

New Albany, Ind.—The Bd. Pub. Wks. has awarded the contract for the construction of a vitrified brick pavement on Vincennes St., from Main St. to the approach to the new Kentucky and Indiana bridge, to Wm. H. Newhouse of New Albany.

Wichita, Kan.—The contract for paving with brick Douglas Ave., between Main St. and Santa Fe Ave., has been awarded to John Ritchie & Sons, at \$1.70 per sq. yd.

Owosso, Mich.—A contract for paving Main St., between Ann Arbor and the Michigan Central Railroad tracks has been awarded by the Bd. Pub. Wks. to G. A. Lowery of Saginaw for about \$8,000.

Laurel, Miss.—A contract for the construction of 17,600 yds. of wood block paving has been awarded to the Southern Paving & Constr. Co., of Chattanooga, Tenn., for \$47,892.

Cincinnati, O.—The Bd. of Control has awarded contracts as follows: Asphalt paving on Chapel St., between Gilbert and Park Aves., to the Kirchner Constr. Co. for \$4,310.50; bituminous macadam pavement on Isabella St., from the north end of the present improvement to Markbreitt Ave., to R. E. Cash at \$9,045.50.

Columbus, O.—The Bd. of Control has awarded what is reported to be the last of the street paving contracts to be let this year. Two contracts for asphalt were awarded to the Andrew Pvg. Co., of Hamilton, for \$66,156. Ten contracts for brick pavement were awarded at a total cost of \$49,360.

Morristown, Tenn.—The contract for the laying of seven blocks of paving in the business district of Morristown has

been awarded to the Murray Constr. Co. of Knoxville.

Walla Walla, Wash.—The Bd. of Co. Comrs. of Walla Walla Co. has awarded a contract for the construction of 5 miles of road to L. Lanning at \$38,900.

BRIDGES

Bids Asked and Prospective Work

Montgomery, Ala.—Sealed bids will be received by W. S. Keller, State Highway Engr., on Nov. 11, 1912, for the construction of two steel bridges with concrete floors and abutments.

Des Moines, Ia.—The Bd. Co. Comrs. of Polk Co. is planning the expenditure of about \$100,000 in the construction of concrete bridges.

Wellington, Kan.—Sealed bids will be received by the Bd. Co. Comrs. of Sumner Co., on Nov. 9, 1912, for the construction of three bridges in accordance with plans and specifications on file at the office of C. E. Croson, Co. Clerk.

Easton, Md.—Sealed bids will be received by the Bd. of Co. Comrs. of Talbot Co. until noon, Nov. 12, 1912, for the construction of a concrete bridge, 1,000 ft. in length, over Miles River, on the Miles River Road, between Easton and Unionville. Plans may be examined, and specification and contract blanks obtained at the office of the State Roads Comm. at Baltimore. Joseph B. Harrington is Clk. of the Bd. of Co. Comrs.

Carthage, Mo.—Sealed bids will be received by the Co. Court on Nov. 7 for the construction of a bridge crossing Spring River, about two miles northeast of Carthage on the Alba Road, in section 33. Bids will be received for a 2-arch reinforced concrete bridge and for a steel structure. Wm. Kohlman is Co. Highway Engr.

Auburn, N. Y.—Sealed bids will be received by the city of Auburn on Nov. 5, 1912, for the construction of a steel bridge over the Osasco River in North St. Plans and specifications may be secured from Elbert C. Aldrich, City Engr. Address J. S. Hanlon, City Clk.

Seattle, Wash.—The Street and Sewer Committee of the City Council has recommended the passage of an ordinance for the construction of a bridge roadway in West Wheeler St., from 15th Ave. west to Thorndyke Ave., and a branch from 15th Ave. to 20th Ave. west, and from 20th Ave. west to Thorndyke Ave. The estimated cost of the improvement is \$130,000. Part of the roadway will be paved with brick and part with asphalt, and it is expected that construction work will begin about Jan. 1, 1913.

Bids Received and Contracts Awarded

Colorado Springs, Colo.—The Bd. of Co. Comrs. of El Paso Co. has awarded a contract for the construction of a reinforced concrete bridge, consisting of two 50-ft. spans, to the Central Constr. Co., of Colorado Springs, for \$6,700.

Denver, Colo.—A contract for the construction of the Downing St. bridge over Cherry Creek has been awarded to the C. P. Allen Contrg. Co., of Denver, for \$13,091.50.

Bartow, Fla.—The Bd. of Co. Comrs. of Polk Co. has awarded a contract for the construction of a bridge across the Alafia

River to the Champion Bridge Co., of Wilmington, O.

Bloomfield, Ind.—The Bd. of Co. Comrs. of Greene Co. has awarded contracts for the construction of two bridges to the Vincennes Bridge Co.

South Bend, Ind.—A contract for the construction of an I-beam bridge on So. Carroll St., across Bowman Creek, has been awarded to Van Skyhawk & Wagner, of Bremen, Ind., for \$1,875.

Elizabethtown, Ky.—The Fiscal Court of Hardin Co. has awarded a contract for the construction of an iron bridge over the Molin River at Star Mills to the Champion Bridge Co., for \$3,000.

Green Bay, Wis.—The City Council has instructed the Mayor to make a contract with the Straus Bascule Bridge Co. for plans for a bridge across the Fox River, to cost \$160,000.

BONDS

Lincoln, Nebr.—Sealed bids will be received by Roscoe C. Ozman, City Clk., until noon, Nov. 20, 1912, for the purchase of special assessment bonds of the city of Lincoln. The bonds amounting to \$42,200, are for the purpose of paying for paving in four paying districts, \$18,200, \$11,100, \$7,200 and \$5,400 respectively. The bonds bear interest at a rate not exceeding 5 per cent. per annum, payable annually.

Carey, O.—The Council has awarded street improvement bonds to the amount of \$8,500 to the First National Bank of Cleveland, O., at a premium of \$342.80.

Cincinnati, O.—Sealed bids will be received by City Audr. Washburn until Nov. 20, 1912, for street improvement bonds to the amount of \$120,000. The bonds will be dated July and September, 1912, and will bear interest at 4 per cent. and mature in 1942.

McArthur, O.—The county authorities of Vinton Co. will receive bids on Nov. 10 for the purchase of 5½ per cent. bridge bonds to the amount of \$6,000. F. A. McCarty is Co. Audr.

Chickasha, Okla.—An election will be held in Grady Co. on Nov. 5 on the question of issuing bridge bonds to the amount of \$40,000.

Bastrop, Tex.—Road bonds for Precinct No. 1 to the amount of \$80,000 have recently been sold.

Hondo, Tex.—Road bonds to the amount of \$40,000 have been voted in Precinct No. 4 of Medina Co.

Houston, Tex.—The City Controller has approved a bond issue of \$2,500,000 voted recently for public improvement in the city of Houston. Of this amount \$300,000 will be used for paving and \$200,000 for the construction of concrete bridges across the ship canal.

Quitman, Tex.—The Attorney General's department of Texas has approved a bond issue of \$120,000 by Wood Co. for roads and bridges.

Eastville, Va.—Sealed bids will be received by the county authorities of Northampton Co. on Nov. 10 for the purchase of \$15,000 of road bonds. Geo. T. Tyson is Co. Clerk.

MISCELLANEOUS

New York, N. Y.—Sealed bids will be received by the President of the Borough of Brooklyn at the office of the President, Room 2, Borough Hall, until 11

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a. m., Nov. 6, 1912, for furnishing and delivering 300 tons of 2,000 lbs. each of refined asphalt, to be delivered at the Municipal Asphalt Plant, 7th St. Basin, between 6th and 7th Sts., near 2nd Ave., and for furnishing and delivering 4,000 cu. yds. of asphalt sand at the same place.

Sealed bids will be received by the Comr. of Bridges at the office of the Dept. of Bridges, 13-21 Park Row, Manhattan, Nov. 7, 1912, for furnishing and delivering lumber to the Williamsburg Bridge, and for furnishing and delivering yellow pine and spruce lumber to the Dept. of Bridges.

Sealed bids will be received by the President of the Borough of Bronx, at the office of the President, Municipal Bldg., Crotona Park, 177th St. and 3rd Ave., The Bronx, until 10.30 a. m., Nov. 8, 1912, for furnishing and delivering pipe fittings for street sign posts, for furnishing and delivering stencil street signs and opal glasses for same, and for

furnishing and delivering steel enameled street signs.

Sealed bids will be received by the Park Bd. at the office of the Dept. of Parks, Arsenal Bldg., 5th Ave. and 64th St., Manhattan, until 3 p. m., Nov. 7, 1912, for furnishing and delivering broken stone and screenings.

St. Paul, Minn.—The Bd. Pub. Wks. is considering the paving of a number of streets in the city at a total estimated cost of about \$1,000,000.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, NOVEMBER 9, 1912

Number
19

Annual Statement of the City of Billings, Montana

The "Annual Statement of the City of Billings, Montana," comprising a list of city officials, a tabular statement of general facts regarding the city, the budget for the fiscal year of 1912, the annual reports of the City Clerk, the City Treasurer, the Chief of Police, the Police Judge, the City Engineer, the Chief of the Fire Department, the Secretary of the Board of Health, the Librarian of the Parmlly Billings Memorial Library, a financial statement of the city of Billings and other matters, has recently been issued. The statement, which was compiled by City Clerk L. E. Torrente, is in the form of a paper covered booklet, 6 ins. by 9 ins. in size, containing 36 pages. It is printed on heavy white paper and illustrated by a number of halftones.

The city of Billings, which was founded in 1882, had a population in 1910 of 10,031, and an assessed valuation in that same year of \$5,681,259, which in 1911 had increased to \$5,733,200, the basis of valuation being about 30 per cent. The total city tax levy is 14 mills on the dollar, of which $2\frac{1}{4}$ mills are for street work (exclusive of sewers) and one mill for park work. The bonded debt on May 1, 1912, the close of the fiscal year, was \$51,000, which after deducting \$12,560.30—the amount of the sinking fund on hand—left a net bonded indebtedness of \$38,437.07.

A considerable amount of statistical information in regard to the streets of the city is given in the report of City Engineer C. A. Durland. According to this report, which is dated May 25, 1912, the pavements of the city at that time were as follows: Creosoted wood block, 36,766 sq. yds., equivalent to a 46-ft. roadway 1.36 miles in length, built at a total cost of \$130,620 or an average of \$3.55 per sq. yd.; vitrified brick, 32,505 sq. yds., equivalent to a 46-ft. roadway 1.2 miles in length, built at a total cost of \$117,071 or \$3.60 per sq. yd.; concrete, 4,214 sq. yds., equivalent to a 34-ft. roadway 0.25 mile in length, built in 1903, at a cost of about \$2.35 per sq. yd., exclusive of the cost of preparing the subgrade and foundation. In addition to these pavements there were 2,000 sq. yds. of concrete alley under construction, which was expected to cost \$4,900.

Within the past two and one-half years, according to the report, twenty improvement districts of concrete walks, curbs and alley crossings have been built. The total amount of these walks is given as 650,160 sq. ft., which is equivalent to 20.5 miles of 6-ft. walk. The total cost was \$104,070, making an average cost of 16 cts. per sq. ft. In addition to this there were about 17.5 miles of private walk. There were 91,110 lin. ft. of concrete curb, which cost \$42,805, or an average of 47 cts. per lin. ft. The concrete alley crossings were 13 in number and had a total area of 58,610 sq. ft. They were each built 20 ft. long and from 12 to 15 ft. wide, the total cost being \$20,952, or an average of 35.7 cts. per sq. ft. In reference to sidewalks, it is stated that approximately 80 per cent. of the entire populated area within the city limits was provided with sidewalks on both sides of the street. The concrete gutters had a total length of 33,840 lin. ft. These are 2 ft. in

width and were built at a total cost of \$22,472 or an average of 66 cts. per lin. ft.

A recapitulation of the financial statement of the city of Billings by W. A. Evans, Auditor, dated Dec. 26, 1911, shows the cost of various improvement works, the amount paid and the amount outstanding for each. These amounts are as follows: Pavements: cost, \$263,301.56; amount paid, \$93,491.19; amount outstanding, \$169,810.37; gutters and storm sewers: cost, \$24,481.30; paid, \$12,140; outstanding, \$12,341.30; walks and curbs: cost, \$166,164.34; paid, \$24,641.80; outstanding, \$141,522.54; alley crossings: cost, \$4,888.55; paid, \$1,600; outstanding, \$3,288.55.

In regard to roads and pavements, City Engineer Durland stated in his report that practically the entire downtown or business district of the city was paved in 1910 and that it was to be hoped that it would be possible to extend the paving into the residential portion of the city. The high first cost of wood block and brick pavements, he said, offered the chief objection to their use on the outlying residence streets, while water bound macadam was no longer satisfactory. For a pavement which could be built at a comparatively low first cost and which would give satisfactory service, he recommended bituminous macadam or bituminous concrete, stating that such a pavement was durable, comparatively noiseless, clean, easy to repair and can be built for about \$2.50 per sq. yd.

The improvement of streets, according to City Engineer Durland, is handled best by the improvement district plan, which includes the building of the sidewalks, curbs and pavements, providing the necessary storm water drainage, setting shade trees and caring for the parkings between the curbs and the property line. He further recommended that the width of residence streets, many of which were 50 ft. wide between curbs, be reduced to about 32 ft., which would effect a very material saving in the cost of paving and, at the same time, permit a desirable increase in the width of the boulevards. The purchase, either exclusively by the city or jointly by the city and county, of a complete, adequate road building equipment would be a long step in the right direction, according to Mr. Durland, who also pointed out that if the city should continue to grow as rapidly during the next few years as it had within the past few, it would be advisable to create a department of public works, which should be under the control of a competent superintendent and be provided with the necessary equipment to handle the construction of all public works, such as pavements, sewers, walks and bridges.

Good Roads Rally of the Automobile Trade League

A meeting, essentially political in nature but designated as a good roads rally, was held under the auspices of the Automobile Trade League in Carnegie Hall, New York City, on the evening of November 1.

It had been planned to precede the meeting by an automobile parade through the city streets, but on account of the inclemency of the weather this was abandoned at a late hour. In order to accommodate the automobilists who

were expected to take part in the parade, a large part of the hall had been reserved and arrangements had been made for admission by ticket. Because of this, the meeting had not been extensively advertised, with the result that after the abandonment of the parade and the throwing open of the hall to the public, the audience was comparatively small.

The meeting was called to order at about 9 o'clock, and was presided over by S. Percy Hooker, State Superintendent of Highways of New Hampshire, who was the chairman of the New York State Highway Commission during the Hughes administration. The chief speaker of the evening was Job E. Hedges, the Republican nominee for Governor of New York State, who was defeated on Tuesday last. Besides Mr. Hedges, there was also present Frank M. Williams, the Republican candidate for State Engineer and Surveyor, who, though unable to speak because of a cold, had prepared a brief address, which was read. Mr. Hedges, who spoke after having made several other addresses in various parts of Greater New York, was the last speaker of the evening and did not arrive until late, the time previous to his arrival being taken up by various other speakers, the principal ones being Mr. Hooker, F. N. Godfrey, formerly Master of the New York State Grange, and former Vice-President of the United States Charles E. Fairbanks.

Most of the addresses, with the exception of those of Mr. Hooker, Mr. Godfrey and Mr. Williams, were solely of a political character. Mr. Hooker, in his address, reviewed the good roads movement in New York from its beginning down to the present, laying especial emphasis on the administration of highway affairs. Mr. Godfrey's address was along similar lines, as was also the address prepared by Mr. Williams. The address of Mr. Fairbanks dealt principally with national political issues and that of Mr. Hedges with political matters in the State of New York, his only direct reference to the highway department being a statement to the effect that he wanted to see the state road system one of highways for the traffic of the state instead of highways to the state treasury.

New Mexico State Good Roads Association Formed

A petition signed by about 50 prominent business men of Salt Lake City, Utah, asking the City Commissioners to undertake the paving of State St., between Ninth and Eleventh South St., Ninth South, from State to Fifth East St., and from Fifth East from Ninth to Tenth South St., has been presented. The petition states that this improvement is most vital to the general welfare of the city as a whole, inasmuch as the city streets referred to are the main arteries of travel in and out of the city to Murray, Midvale, Sandy, Holliday, Mill Creek and other communities to the south and southeast. Meetings have been held for several days in the interest of the improvement. Residents in the territory affected have been interviewed, and there is said to be an almost unanimous desire that the improvement be made.

Report of the Road Commissioners of Genesee County, Michigan

According to a report recently submitted by the County Board of Road Commissioners of Genesee County, Mich., of which Flint is the county seat, approximately \$95,000 has been expended, between April 1 and October 1, of the current year, in laying the foundation of the road system made possible by the issuance of \$100,000 in bonds last spring.

The report gives a detailed statement of where all the money so far used has been spent—how much in each township and how much on each road. It also gives a

statement of the intentions of the road commissioners and some of the difficulties they have encountered. According to the report, work has been started on all the main roads leading to the city of Flint, and is nearing completion as rapidly as possible. When completed, these roads will form the nucleus of the road system of the county, as all other roads connect with these highways.

The roads already completed have all been built according to the specifications of the State Highway Department, and the same specifications are being used in the work in progress.

Second Issue of Bonds in Copiah County, Mississippi, Declared Valid

A decision on a question of considerable interest to Mississippi counties voting bonds for road improvement was handed down recently in the Supreme Court of that state.

The law authorizing supervisors' districts to issue bonds for road improvement provides that the amount of bonds which a district proposes to issue shall be first fixed by the road commissioners appointed under the provisions of the act and that this action by the commissioners shall be approved by the board of supervisors. Because of the somewhat obscure wording of the statute, it has been held by some lawyers that the whole amount of the bond issue needed must be fixed upon before any bonds are issued.

Copiah County issued bonds to the amount of \$75,000 for the construction of roads leading into Hazlehurst, the county seat, and after spending the proceeds of that issue made a second issue, also of \$75,000. These bonds were purchased by the Capital City National Bank of Jackson, but before they were delivered attorneys employed to examine the statutes questioned the legality of the issue on the ground that the law had not been complied with because the entire amount had not been proposed before any were issued. A test case was brought, and the validity of the issue was argued before the Supreme Court by J. S. Sexton, attorney for the Board of Supervisors and a former president of the Mississippi Bar Association. The Supreme Court, in a decision handed down on Oct. 21, upheld the validity of the second issue.

Annual Convention of the Texas State Good Roads Association

The annual convention of the Texas State Good Roads Association was held late in October at Dallas. The program was participated in by several prominent citizens of Texas interested in good roads.

Judge O. E. Dunlap of Waxahachie, the retiring president, spoke on the saving made by farmers of Ellis County in hauling their farm products to market since the improvement of the road system of that county. He said that during the last few years Ellis County had issued and sold \$980,000 worth of road bonds, that there had been built 260 miles of permanent roads in the county, and that another 100 miles were to be built in the future.

The following officers were elected for the coming year: President, J. W. Warren, San Antonio; Vice Presidents, E. W. Kirkpatrick, McKinney; H. J. Bradshaw; Abilene; J. S. Kerr, Sherman; Secretary, Homer D. Wade, Stanford; Treasurer, A. V. Lane, Dallas; Highway Engineer, R. J. Potts, College Station.

It is stated that each of the 62 counties of Colorado will spend an average of \$10,000 on roads during the coming year. The public road work done by the state's convicts will amount to the equivalent of \$250,000, and the appropriation for road work by the state Legislature will probably amount to about as much more.

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A BOND ISSUE CAMPAIGN IN ALABAMA.

Among the resolutions adopted at the recent annual convention of the Alabama Good Roads Association, an account of which was printed in the issue of November 2, was one recommending a \$50,000,000 state bond issue for the purpose of building a system of intercounty and state highways. It was further provided in the resolution that the association request the next Legislature to pass an act calling an election to so amend the constitution as to enable electors to vote on the question of a bond issue.

Under the present highway law of Alabama, money for state aid is taken from the convict fund. From this, each county receives an allotment of \$2,000 per year provided it appropriates an equal amount. The allotment to any county may be increased to \$4,000 per year by the governor if the condition of the treasury permits it. This law, which was passed in 1911, created a state highway commission consisting of five members—the professor of geology at the University of Alabama, the professor of engineering at the Alabama Polytechnic Institute and three members to be appointed by the governor. The commission appoints a highway engineer, who, in turn, appoints his assistants with the approval of the commissioners. The state highway engineer acts in an advisory capacity for the benefit of the county and township officials, the county work being in the hands of the counties. In some of these, road work is in charge of the county commissioners and in others is controlled by boards of revenue. Some of the counties have highway engineers and others do not.

By the passage of this law Alabama took her place among the states that have adopted the state aid principle, and, moreover, started in on a larger scale than some of the states that took the step earlier, for the amount provided by the state for the first year's work—\$154,000 in 1911—was considerably more than the initial appropriation made in many other states. But spread over 78 counties, this amount could not be expected to much more than make possible a beginning of road improvement, and there is probably no question but that a larger fund is needed. The voting of bonds is a logical method of securing it, and the method is by no means untried in Alabama, since many of the counties have already successfully followed the bond issue plan.

The raising of money in this way has many advantages,

two of the most obvious being the ability to secure immediate benefit and the possibility of doing the work at a lower cost because of the comparatively large amount which can be undertaken. It should be borne in mind, however, that the practice of issuing bonds for periods longer than the probable life of the improvements for which they are to pay is to be avoided, and in arranging the details of the proposed bond issue in Alabama adequate provisions should be made for the final redemption of the bonds and for maintaining the roads built with the proceeds.

The Alabama Good Roads Association is the logical agency to work for a bond issue and it is to be hoped that its efforts will meet with success.

Meeting of the Ohio Good Roads Federation

A meeting of the Ohio Good Roads Federation was held at Columbus, Ohio, recently, at which various means of raising funds for highway improvement in Ohio were discussed and officers were elected for the coming year.

After discussing various plans proposed for raising money, including that of Jacob S. Coxey of Massillon, of which mention was made in "Good Roads" for Nov. 2, it was decided that the making of a direct levy by legislative act was the most feasible. A resolution was adopted pledging the federation to work for the enactment, at the coming session of the Legislature, of such a law, authorizing a direct tax levy of \$3,000,000 on the grand tax duplicate of the state.

A committee was also appointed for the purpose of urging the Ohio State University and other educational institutions having engineering departments to establish courses in road construction and maintenance. State Highway Commissioner James R. Marker is said to favor this plan and to have suggested a course of instruction lasting six weeks and open to engineers, county commissioners, township trustees and others interested in the subject of road building.

Officers for the coming year were elected as follows: President, Jesse Taylor, Jamestown; Vice Presidents, F. A. Seiberling, Akron; Harry Vartrieb, Toledo; A. P. Sandles, Ottawa; John N. Willys, Toledo, and David Dunham, Lebanon; Secretary, H. K. Laird, Columbus; Treasurer, B. S. Humphreys, Cleveland; State Superintendent, W. A. Alsdorf, Johnstown, and Counsel, Smith W. Bennett, Columbus.

New York State Voters Endorse \$50,000,000 Bond Issue

Information received at the time of going to press indicates that the referendum measure providing for a bond issue of \$50,000,000, to run for 50 years, the proceeds to be used in the further extension of the New York state system of highways, which was enacted at the last session of the State Legislature, and submitted to the voters of the state at the election November 5th, was carried.

While the returns are not all in from the outlying districts, and accurate figures are, therefore, not available, the indications are, at present, that the majority in favor of the bond issue was a decisive one.

A majority of the county commissioners of King County, Wash., recently voted an appropriation of \$399,000 for the county road and bridge fund for 1913. This action was taken in order to anticipate the tying up of road work in the county for a year in event of the defeat of the proposed \$3,000,000 bond issue soon to be voted upon.

Coming Meetings

Nov. 12-15.—American Society of Municipal Improvements. — Annual Convention, Dallas, Tex.—Secy. A. Prescott Folwell, 5 Union Square New York, N. Y.

Nov. 19-22.—American Civic Association.—Annual Convention, Baltimore, Md. Secy., Richard B. Watrous, Union Trust Bldg., Washington, D. C.

Nov. 20-21.—Southern Appalachian Good Roads Association.—Fourth Annual Convention, Atlanta, Ga. Secy., H. B. Varner, Lexington, N. C.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec. 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Personal Notes

C. Durban has been appointed Assistant City Engineer of London, Ontario.

H. P. Hayes has been appointed county road engineer of Tarrant County, Texas.

L. O. Beam, Inspector of Public Works in the province of Saskatchewan, has resigned.

Thomas Early, Chairman of the Los Angeles, Cal., Highway Commission, is reported to be seriously ill at the Pasadena Hospital. It is stated that there is little hope for his recovery.

General Notes

The second Federal Aid Good Roads convention will be held under the auspices of the American Automobile Association at Washington, D. C., March 6-7, 1913.

The Portage County Improvement Association was organized October 26, at Ravenna, O., one of the principal objects of the organization being to promote the proper maintenance and improvement of highways in the county. The officers elected are: D. R. Hanna, Ravenna, President; William Getz, Kent, Vice-President; C. R. Sharp, Ravenna, Secretary; C. G. Bentley, Ravenna, Treasurer; G. P. Shuman, Atwater, R. M. Wheeler, Mantua, N. H. Merwin, Palmyra, and J. A. Fisher, Windham, together with the officers, were appointed members of the Executive Committee.

The city of Elmira, N. Y., has purchased a new portable plant for constructing and repairing asphalt pavements.

A stock company will be organized at Somerset, Ky., for the purpose of building a pike from Somerset to Waynesburg, to connect with the Lincoln County Pike, and from Somerset to the Cumberland River, to connect with the Monticello Pike. The plan is to use the route of the county road and to put in toll gates. It is said that the Fiscal Court will grant permission. The estimated cost of construction is \$30,000.

It is stated that the city of St. Paul, Minn., is so well satisfied with the results of its experiments with its municipal paving plant that the Board of Public Works will recommend to the city conference committee when it meets to compile the 1913 budget, that the city do all its own paving work next year instead of making awards to contractors. City Engineer Claussen estimates that the city saved ten per cent. of the paving cost this year in the work it did, taking as a basis the lowest bid received from contractors. Mr. Claussen is preparing figures to verify his estimate.

According to a ruling made by City Court Justice Green of New York City, a ditch is not a part of a road. This decision was made when Justice Green refused to set aside the verdict of a jury in a suit brought against the Employers Liability Assurance Co. of London to recover \$767 when a car of the plaintiff ran into a ditch and was smashed. The insurance company, which had insured the automobile of the plaintiff, refused to pay the indemnity on the ground that the automobile was damaged by collision with part of the road, a phase which the policy did not cover. The jury had given a verdict for the full amount and this verdict was sustained by the Justice.

Trade Notes

The Alamo Paving Co. has been incorporated at San Antonio, Texas, with a capital stock of \$25,000. The incorporators are J. P. Nelson and T. M. West of San Antonio, and R. L. White of Beaumont.

The announcement is made by the Atlas Portland Cement Co. of New York City, that the 5,000,000 bbls. of cement manufactured by that company for the construction of the Panama

Canal has been accepted without the rejection of a single barrel. The United States Government has ordered the company to supply, in addition, all the cement necessary to complete the work in the canal zone.

The Petrolithic Good Roads Construction Co., of New Orleans, La., of which Ex-Governor Jared Y. Sanders of Louisiana is president, recently entertained a party of about 150 residents of New Orleans, Thibodaux, Donaldsonville, La Fayette, Franklin and other places, on an inspection trip over the new road being constructed by the company between Jeanerette and New Iberia. The trip was made on a special train, which made stops at various places along the line where work was being done and by automobiles and on foot at each of the stops.

Warren Bros. Co. of Boston, Mass., has issued a statement of a traffic record taken between 7 a. m. and 9 p. m. on September 1, 1912, on the bitulithic pavement laid in 1905 on Sheridan Road Boulevard, Chicago, between Byron St. and Evanston Ave., a distance of approximately 3,000 ft. The aggregate of all vehicles, including horse drawn, bicycles, motorcycles and automobiles totalled 7,589, with an estimated combined tonnage of 11,977. The width between the curbs is 40 ft., and the number of tons per foot of width was, therefore, 299. The statement is made that no repairs have been made on this stretch of street since the pavement was laid seven years ago.

A decree has been handed down in the United States District Court for the Western District of Pennsylvania sustaining the validity of the various patents issued to Daniel B. Luten for improvements in arch structures, improvements in bridges of concrete or other analogous material, for improvements in skew arches, and in vaults and conduits, at various times in the last few years. The decision was given in a suit instituted by Mr. Luten against Henry and John Minns doing business under the name of Minns Bros., and W. H. Overdorf. In the decision W. H. Overdorf was declared guilty of infringement of the claims of the said patents in that he had prepared plans for the erection of a bridge embodying the inventions covered by the patents. Inasmuch as no profit was made by the defendant, the judgment ordered that the complainant recover nominal damages together with the cost of the suit.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

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11-11 Los Angeles, Cal., county road work	11-9
11-11 Houston, Tex., bitulithic and wood block paving	11-2
11-12 Indianapolis, Ind., gravel roads.....	11-2
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11-18 Sacramento, Cal., State highway work	11-9
11-21 Shelbyville, Ind., gravel road.....	11-2
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11-12 Eufaula, Ala., two steel bridges.....	11-9
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11-20 Lincoln, Neb., paving	11-2
11-20 Cincinnati, O., street	11-2
12-7 Pearsall, Tex., road	10-19

ROADS AND STREETS.

Bids Asked and Prospective Work.

Montgomery, Ala.—Bids will be received by the court of Co. Comrs. of Perry Co. until 2 p. m. Nov. 11, 1912, for grading about four miles of the Hamburg Rd. Estimated cost, \$3,000. Geo. C. Scales is Co. Highway Engr.

Escondido, Cal.—The City Engr. is preparing plans for the paving with decomposed granite of several improvement districts.

La Jolla, Cal.—The paving of Prospect Ave. for a distance of 1½ miles with asphalt is contemplated.

Los Angeles, Cal.—The Bd. of Spvrs. will receive bids up to Nov. 11 for the construction of 2.79 miles of the Compton-Clearwater road, requiring 4,300 cu. yds. of excavation, 14,480 lin. ft. of shaping roadbed, 10,200 tons of oil macadam, 32.8 cu. yds. of class A concrete, 1,430 lbs. of steel, 32 ft. of 12-in. reinforced concrete pipe, and 300 lin. ft. of stand guard fence. Also for the construction of 2.71 miles of the Foothill Blvd. (Citrus Ave.), requiring 4,800 cu. yds. of excavation, 6,350 lin. ft. of shaping roadbed for oil macadam paving, 7,966 lin. ft. of shaping roadbed for 5-in. concrete paving with bituminous wearing surface, 259.8 cu. yds. of class A concrete, 24,118 lb. steel, 100 lin. ft. st. gu. fence.

The St. and Blvd. Com. of the City Council voted to permit R. D. List to pave six miles of streets in Chesterfield Tract, with 1½-in. of asphalt wearing surface on a 3-in. concrete base.

The city will receive bids soon for the paving with asphalt of Alhambra Ave., from Mission Road to the east city limits; Mission Rd., from Alhambra Ave. to East Lake Ave.; East Lake Ave., from Mission Rd. to North Main St.; Alameda St., between Seventh and Twenty-fifth Sts.

National City, Cal.—The Trustees will call for bids soon for the improvement of 12th, N and Fifth Sts. The estimated cost of the work is 50c. per front ft. The Trustees are preparing to call for bids for the paving of National Ave. with asphalt for a distance of 2½ miles. The City Engr. has estimated the cost at 18c. per sq. ft., or \$103,712.40.

Riverside, Cal.—The sum of \$75,000 is to be spent for permanent improvements on the roads in Riverside county during the coming year. Of this amount \$55,000 is to go for permanent macadam and rock ballasted road beds and \$20,000 for oil to be used on other roads during the next 12 months.

Sacramento, Cal.—Bids will be received up to 2 p. m., Nov. 13, by the California Highway Comm. for several new state highway contracts under the \$18,000,000

bond issue. The commission furnishes cement and oil on all the work. The contracts to be let are as follows: San Diego county, 10.31 miles of 15-ft. roadway, concrete base with bituminous wearing surface, between Encinitas and Oceanside; the work requires 15,573 cu. yds. of excavation, 68 lin. ft. of 12-in. corrugated iron pipe, 18.35 cu. yds. of class B concrete in monuments and culverts, 10,082 cu. yds. of class B concrete in pavement, 630 cu. yds. coarse sand, 788 tons broken stone screenings, 810 bbls. asphaltic concrete and 7,542 lin. ft. of guard rail, 205 monuments; Merced county, 14.17 miles of 15-ft. roadway, concrete base and bituminous wearing surface; Butte county, 11.23 miles between Lindo Channell and the north county line, concrete base with bituminous wearing surface; San Mateo county, 0.215 miles of 25-ft. concrete base with 1½-in. of sheet asphalt surface, between Oak Grove and Bellevue Drive; San Mateo county, 3.3 miles macadam base and 1½-in. asphalt concrete, between Redwood City and San Mateo county line; Santa Clara county, 12.95 miles 15-ft. concrete base with bituminous surface between Edendale and Morgan Hill; Stanislaus county, 0.63 miles concrete base with oil surface through Ceres; San Luis Obispo county, 6.4 miles 15-ft. road, concrete base with thin bituminous wearing surface, between San Luis Obispo and San Margaretta; Mendocino county, 6.88 miles of grading, culverts and surfacing with local gravel between Ridgwood and Willets.

San Diego, Cal.—Engineer John Fred Rhodes is preparing plans for a mountain road 12 miles long, between Mountain Springs and Coyote Wells. The sum of \$50,000 is available for the work.

San Francisco, Cal.—Plans are being prepared in the office of the constructing quartermaster at Fort Mason for the construction of an asphalt road from Letterman Hospital to the National Cemetery. The road will have a concrete base and 4-in. top and binder. The estimated cost is \$25,000. The width is 25 ft.

Surveys have been made for the extension of the 13th Ave. Blvd. through the Marine Hospital grounds connecting with the Presidio road system. Estimated cost is \$16,000.

The Bd. of Pub. Wks. has recommended to the supervisors that \$2,500 be set aside from the Civic Center bond issue funds to cover the expense of surveys and plans for the proposed extension of Hyde, Leavenworth, Fulton and Grove Sts. to or through the Civic Center territory.

The Bd. of Pub. Works granted property owners permission to make street improvements by private contracts at the following locations: Paving and curbing, Jersey, between Church and Dolores; Vienna, between Brazil and Persia; Winfield, between Cortland and Eugenia; Thirteenth, between Clement and California; crossing of Richland and Leese Sts.; Twentieth, between Church and Sanchez; Twenty-first, between Lincoln and Irving; Balboa, between 13th and 14th; Twelfth, between Babrillo and Fulton; Twenty-ninth, between Clement and California; Mission, between College and Bosworth; Osage, between 25th and 26th; crossing of 18th Ave. and Anza; grading Twenty-seventh Ave., between Cabrillo and Balboa; Diamond, between Chenery and Surrey; Grove, between Masonic and Asbury.

The Bd. of Pub. Wks. has granted permission to property owners to improve the following streets by private contract: Moultrie St., between Tompkins and Ogden; 38th St., between Irving and Lincoln; crossing of 17th St. and Cabrillo; 16th St., between Castro and Flint; Coso Ave., between Precita and Bernal; crossing of Mason and Beach; Anza, between Arguello and Second Ave. The Bd. of Pub. Wks. has been authorized to improve the following streets: Sansome St., between Bush and Pacific, at a cost of \$20,000; California St., between Drum and Front Sts., at a cost of \$7,000; Kearny St., between Sacramento and Clay Sts., at a cost of \$7,000; Mission St., between Crescent and Marshall, at a cost of \$18,000.

Santa Barbara, Cal.—The City Engr. is busy on plans for the construction of the boulevard to encircle the city which will be nine miles in length.

South Pasadena, Cal.—The Bd. of Trustees is contemplating bonding the city for the purpose of paving Huntington Drive, Fair Oaks Ave., Mission St. and Pasadena Ave.

De Land, Fla.—It is reported that the

City Council is considering the construction of several miles of concrete sidewalks.

Fernandina, Fla.—Dec. 18 bids will be received for doing all work for laying about 11,000 sq. yds. of vitrified brick pavement. Address G. L. Baltzell, City Clerk.

St. Augustine, Fla.—The City is reported to be about to undertake the repair of the asphalt paved streets. Address S. W. Talmage, City Clk.

Sarasota, Fla.—It is reported that \$15,000 will be expended for street paving in the city of Sarasota. H. L. Higel is Mayor.

Tampa, Fla.—It is reported that the City Council has planned to pave five miles of streets. D. P. McKay is Mayor.

Chicago, Ill.—The City Council has ordered the improvement, including paving, of the following: The alley between W. Harrison and York Sts., vitrified brick pavement; S. St. Louis Ave. between Fillmore and W. 12th Sts., asphalt pavement; a portion of S. Leavitt St., asphalt pavement; Wilcox St. between S. Oakley Blvd. and South Western Ave., vitrified brick; S. Center Ave. between Blue Island Ave. and W. 14th Pl., vitrified brick; Ogden Ave. between S. 40th Ave. and the Chicago & Western Indiana Belt R. R., vitrified brick; N. Prairie Ave. between W. Lake St. and W. Chicago Ave., asphalt pavement; alleys between Garfield Ave., Center St., Sheffield Ave. and Osgood St., vitrified brick; alleys between Grant Pl., Belden Ave., N. Clark St., Sedgwick St. and Cleveland Ave., vitrified brick; S. May St. between W. 21st and W. 22d Sts., asphalt pavement; La Salle St. between Archer Ave. and W. 22d St., vitrified brick; W. 22d St. and W. 21st Sts., between S. La Salle St. and Wentworth Ave., vitrified brick; Ashland Pl. from N. Ashland Ave. to the alley east of N. Ashland Ave., vitrified brick.

Rock Island, Ill.—The Bd. of Local Imps. has ordered the laying of concrete sidewalks on about 70 blocks in the district bounded by 14th and 18th Aves., and 20th St.

Pikeville, Ky.—Bids will be received Dec. 2 for 25,000 sq. yds. of street paving, work to begin early in spring. Address A. R. Reese, City Clerk.

Baltimore, Md.—The Paving Comm. has selected 30 miles of streets in addition to the 31 miles already completed or under contract for improvement in 1913. The work is divided into 4 lots, the first of which includes streets now available for improvement because the underground work has been completed; the second, those which will be available before June 1, 1913; the third those which will be available between June 1 and Sept. 30, 1913; the fourth those which will be available after Sept. 30, 1913.

The streets now available are as follows: Bloom St. between Pennsylvania Ave. and Eutaw Pl.; Gold St. between Druid Hill Ave. and North Ave.; Preston St. between Druid Hill and Linden Aves.; Robert St. between Eutaw Pl. and Linden Ave.; Laurens St. between Pennsylvania and Druid Hill Aves.; Laurens St. between Eutaw Pl. and Linden Ave.; Maryland Ave. between Chase and Preston Sts.; Maryland Ave. from the Pennsylvania Bridge to North Ave.; Wilson St. between Madison St. and Eutaw Pl.; Fayette St. between Pine and Paca Sts.; West St. between Light St. and Riverside Ave.; Homewood St. between Chase and Hoffman Sts.; McKim St. between Eager and Madison Sts.; Saratoga St. between Calvert and Gay Sts.; Frederick St. between Lexington and Gay Sts.; Lombard St. between South and Gay Sts.; Commerce St. between Lombard and Pratt Sts.; Hollingsworth St. between Lombard and Pratt Sts.; Ellicott St. between Lombard and Pratt Sts.; Grant St. between Water and Pratt Sts.; Custom House Ave. between Water and Lombard Sts.; Pleasant St. between Calvert and Guilford Sts.; Greene St. between Lexington and Baltimore Sts.; Low St. between East and Front Sts.; Forrest St. between Lexington and Fayette Sts.; Watson St. between High St. and Central Ave.; Granby St. between Exeter St. and Central Ave.; High St. between Pratt and Trinity Sts.; Stiles St. between High and Exeter Sts.; Exeter St. between Pratt and Fawn Sts.; Trinity St. between Albermarle and Exeter Sts.; Lloyd St. between Lombard and Baltimore Sts.; Dallas St. between Lombard St. and North Ave.; Monument St. between Ensor St. and Central Ave.; Som-

erset St. between Biddle and Madison Sts.; Stirling St. between Alsquith and Mott Sts.; Mott St. between Gay and Ensor Sts.; Wilcox St. between Eager and Hoffman Sts.; Charles St. between Barre and Hughes Sts.; Ashland Ave. between Alsquith St. and Broadway; Federal St. between Ensor St. and Broadway; Collington Ave. between Orleans St. and Fairmount Ave.; Madeira St. between Fairmount Ave. and Eager Pl.; Monument St. between Wolfe St. and Patterson Park Ave.

The streets available before June 1, 1913, are as follows: McMechen St. between Pennsylvania Ave. and McCulloh St.; Division St. between Lafayette Ave. and Mosher St.; Eastern Ave. between Patterson Park Ave. and Patuxent St.; Alliceanna St. between East Falls Ave. and President St.; Fort Ave. from Lawrence St. to Fort McHenry; Preston St. between Cathedral and Valley Sts.; Hill St. between Sharp and Charles Sts.; Hamburg St. between Light and Covington Sts.; William St. between Hamburg and Warren Sts.; Battery St. between Hamburg and Warren Sts.; Centre St. between St. Paul and Fallsay Sts.; Ridgely St. between Fremont and Ostend Sts.; Andre St. from Fort Ave. to German Lloyd pier; President St. between Lancaster St. and Eastern Ave.; President St. between Fawn and Pratt Sts.; Mosher St. between Park and Mount Royal Sts.; Linden St. between Biddle and Dolphin Sts.; Biddle St. between Fallsay St. and Hunter alley; Biddle St. between St. Paul and Cathedral Sts.; Harrison St. between Baltimore and Gay Sts.; Franklin St. between Charles and St. Paul Sts.; Franklin St. between Calvert and Guilford Sts.; Fayette St. between Harrison St. and Central Ave.; Guilford St. between Lexington and Preston Sts.; Guilford St. between Bridge and Lanvale Sts.; Sharp St. between Hill and Ostend Sts.; Bath St. between Fallsay and Calvert Sts.

The streets which will be available by September 30, 1913, are as follows: McMechen St. between Park and North Aves.; Howard St. between Richmond and Cathedral Sts.; Park Ave. between Howard and Lanvale Sts.; Maryland Ave. between Preston and Lanvale Sts.; Lafayette Ave. between Maryland and Greenmount Aves.; Eastern Ave. between President St. and Patterson Park Ave.; Alliceanna St. between President and Caroline Sts.; Patterson Park Ave. between Pratt and Essex Sts.; Eden St. between Lancaster and Madison Sts.; Lombard St. between Exeter and Washington Sts.; Pratt St. between Central and Patterson Park Aves.; Wolfe St. between Baltimore and Pratt Sts.; Chapel St. between Baltimore and Pratt Sts.; Washington St. between Baltimore and Alliceanna Sts.; Hamburg St. between Light and Sharp Sts.; Cross St. between Charles and Sharp Sts.; Montgomery St. between Hanover and Charles Sts.; Paca St. between Fremont Ave. and Pratt Sts.; Paca St. between Baltimore and Lexington Sts.; Fremont Ave. between Lexington and Saratoga Sts.; Fayette St. between Howard St. and Park Ave.; Water St. between South and Light Sts.; Lombard St. between Paca and Hopkins Sts.; Fayette St. between Paca and Eutaw Sts.; Guilford Ave. between Preston and Bridge Sts.; Charles St. between Montgomery St. and Fort Ave.; Edmondson Ave. between Fulton Ave. and Gilmor St.; Edmondson Ave. between Calhoun and Fremont Sts.; Harlem Ave. between Pulaski and Gilmor Sts.; Harlem Ave. between Calhoun St. and Femont Ave.; Mulberry St. between Schroeder St. and Fulton Ave.; Madison St. between Cathedral and Eutaw Sts.; East Falls Ave. between Alliceanna and Stiles Sts.

The streets which will be available after September 30, 1913, are as follows: Fremont Ave. between Saratoga and Mosher Sts.; Fremont Ave. between Mosher St. and Pennsylvania Ave.; Howard St. between Centre St. and Armory Pl.; Fremont Ave. between Ridgely and Warner Sts.; Paca St. between Lexington and Franklin Sts.; Mosher St. between Fremont Ave. and McCulloh St.; Fort Ave. between Light and Hanover Sts.; George St. between Fremont and Pennsylvania Aves.

Corunna, Mich.—The Bd. Spvrs. of Shawnee Co. has voted an appropriation of \$30,000 for road work during the coming year.

Detroit, Mich.—The Dix Ave. Improvement Assn. is urging the paving of Dix Ave. between Dearborn Road and the city limits.

Mt. Clemens, Mich.—The Bd. Spvrs. of Macomb Co. has voted an appropriation of \$54,000 for the construction of state road roads in that county.

Duluth, Minn.—The property owners of

Highland St. are circulating a petition for the pavement of that street between 59th and 65th Aves., west.

Kansas City, Mo.—The County Court of Jackson Co. has called upon the county surveyor to furnish plans and estimates for macadamizing the Blue Ridge road at Swope Park. The road will be built three miles long, and the macadam will be 30 ft. wide. The estimated cost is about \$30,000.

Hastings, Neb.—An ordinance has been passed authorizing the issuance of bonds for paying the cost of paving and curbing that part of Burlington Ave. lying between the south side of Second St. and the north side of the right of way of the Chicago, Burlington and Quincy Railway.

Roswell, N. M.—It is reported that one block on W. 3d St. will be paved with brick this fall. This work, if done, will be the first paving work in the city.

New York, N. Y.—Sealed bids will be received by the President of the Borough of the Bronx at his office in the Municipal Bldg., 177th St. and Third Ave., until 10:30 a. m., Nov. 14, 1912, for regulating, grading, setting curbstones, flagging sidewalks, laying crosswalks, building approaches and erecting fences where necessary in Parker St., from Westchester Ave. to Lyon Ave., and for paving with sheet asphalt the roadway and sidewalks of the 172d St. bridge over the N. Y., N. H. & H. R. R. tracks.

Alliance, O.—An ordinance has been passed authorizing the levying of a special assessments for the improvement of S. Liberty Ave., between Milner and College St., by grading, draining, curbing and paving with brick.

Athens, O.—An ordinance has been passed authorizing the levying of special assessments for the improvement of First St., between Cemetery and Walker Sts.; the improvement of Walker St. between First St. and Miller alley, and the improvement of Miller alley, between Walker and West State Sts., by grading, draining, curbing and paving with brick or block, and providing for the issuance of bonds in anticipation of special assessments therefor.

Cincinnati, O.—Sealed bids will be received by the Bd. Co. Comrs. of Hamilton Co. until noon, Nov. 22, 1912, for lengthening the culvert and macadamizing over the new fill on the Toph road north of Harrison Pike in Whitewater Twp. Plans and specifications for the work are on file at the office of the Bd. Co. Comrs., where blank bidding forms may be obtained. Stanley Struble is Pres. of the Bd., and Albert Reinhardt is Clk.

Cleveland, O.—The following ordinances have been passed by the City Council: Determining to proceed with the improvement of De Forest Rd., S. E. from Cedar Ave., S. E. to the south line of Sturtevant St., S. E. by grading, draining, setting curbs, paving with brick on concrete and improving to the established grade; declaring it necessary to improve Peach Court, S. W. from W. 41st Pl. to W. 44th St. by grading, draining, paving with brick and improving to the established grade; declaring it necessary to improve E. 109th St. from Fairchild Ave., S. E. to Deering Ave., S. E. by grading, draining, setting curbs, paving with brick on concrete and improving to the established grade; declaring it necessary to improve Sturtevant St., S. E. from Stearns Rd. S. E. to De Forest Rd. S. E., by grading, draining, setting curbs and paving with Medina stone block and brick on concrete, and improving to the established grade; declaring it necessary to improve Schott Ave., S. W. from W. 61st St. to W. 65th St., by grading, draining, setting curbs, paving with brick on concrete and improving to the established grade; declaring it necessary to improve 37th St., from Kinsman Rd., S. E. to Mt. Auburn Ave., S. E., by grading, draining, setting curbs, and paving with dressed block Medina stone on concrete and improving to the established grade; declaring it necessary to grade, drain, curb and pave with brick Selden Court, S. W., and W. 42nd Pl., from W. 43rd St. to Cyril Ave., S. W.; declaring it necessary to grade, drain, curb and pave with brick on concrete W. 96th St., from Macon Ave., N. W., to Laird Ave., N. W.

Cleveland, O.—Resolutions have been adopted by the City Council for street work as follows: Platten Ave., N. W. between W. 35th St. and W. 39th St., grading, draining, curbing and brick paving; Sackett Court, S. W. between W. 25th St. and Scranton Rd., S. W., grading, draining, curbing and brick paving; Schott Ave., S. W. between W. 61st and W. 65th Sts., grading, draining, curbing and brick

paving; Theodore Ave., N. W. between W. 98th and W. 100th Sts., grading, draining, curbing and brick paving; Leo Ave., N. W. between W. 95th and W. 100th Sts., grading, draining, curbing and brick paving; Peach Court, S. W. between W. 41st and W. 44th Sts., grading, draining and brick paving; W. 62d St. between Schott Ave., S. W. and Sargent Ave., S. W., grading, draining, curbing and brick paving; E. 109th St. between Fairchild Ave., S. E. and Deering Ave., S. E., grading, draining, curbing and brick paving; Schraff Ave., N. W. between W. 98th and W. 100th Sts., grading, draining, curbing and brick paving; Selden Court, S. W. and W. 42d Pl. between W. 43d St. and Cyril Ave., S. W., grading, draining, curbing and brick paving; W. 62d Pl. between Fanwell Court, S. W. and Schott Ave., S. W., grading, draining, curbing and brick paving; Sturtevant St., S. E. between Stearns Road, S. E. and De Forest Road, S. E., grading, draining, curbing and Medina block paving; E. 37th St. between Kinsman Road, S. E. and Mt. Auburn Ave., S. E., grading, draining, curbing and Medina block paving; Laird Ave., N. W. between W. 95th and W. 98th Sts., grading, draining, curbing and brick paving; E. 122d St. between Ashbury Ave., N. E. and Wade Park Ave., N. E., grading, draining, curbing and brick paving; Nicholas Ave., N. W. between W. 98th and W. 100th Sts., grading, draining, curbing and brick paving; DeForest Road, S. E. between Cedar Ave., S. E. and Sturtevant St. S. E., grading, draining, curbing and brick paving; W. 63d St. between Sargent Ave., S. W. and Prague Ave., S. W., grading, draining, curbing and brick paving.

Columbus, O.—Sealed proposals will be received by the Dir. of Pub. Service of the city of Columbus at his office in City Hall until Nov. 12 for the following improvement: Grading, draining, curbing, paving the roadway with asphalt or brick, and laying water service pipe on Harris Ave., from Olive St. to Sullivant Ave.; grading, draining, curbing, paving the roadway with asphalt or brick and laying water service pipe on Ogden Ave., from Palmetto St. to Sullivant Ave.; grading, draining, curbing, paving the roadway with asphalt or brick and laying water service pipe on Warren Ave., from Palmetto St. to Sullivant Ave. The work is to be done in accordance with plans, profiles, specifications, and estimates on file in the office of the Director of Public Service. S. A. Kinnear is Director of Public Service.

Sealed bids will be received at the office of the State Highway Commission at Columbus, O., until 10 a. m., Nov. 15, 1912, for the following state road work: Grading and paving with waterbound macadam East Center Road in Bloom Twp., Seneca Co., length 5,765 ft., width 10 ft., estimated cost of construction \$4,733.47; grading and paving with waterbound macadam the West Center road in Bloom Twp., Seneca Co., length 5,370 ft., width 10 ft., estimated cost of construction \$4,312.04; grading and paving with brick for heavy traffic the Salem Ellsworth Road in Perry Twp., Columbiana Co., length 5,280 ft., width 10 and 14 ft., estimated cost of construction \$16,209.91; grading and paving with waterbound macadam the Kilbourne road in Eden Twp., Seneca Co., length 5,280 ft., width 10 ft., estimated cost of construction \$4,785.72. Plans and specifications for the above work are on file in the office of the Co. Comrs. and the State Highway Department. James R. Marker is State Highway Comr.

Dayton, O.—Ordinances have been passed authorizing the levying of special assessments for the following improvements: Wayne Ave., between Epworth and Arbor Aves., by setting cement curb and paving with Trimble block; Carlisle Ave., between Wayne Ave. and Wyoming St., by setting cement curb and paving with Nelsonville block.

An ordinance has been passed determining to proceed with the improvement of the alley east of Wayne Ave., from Margaret St. to Gebhart St., by paving with brick or cement.

Elyria, O.—A petition for the surveying and establishing of a new county road extending from Pearl Ave. to N. Ridge Road will be presented to the Bd. of Co. Comrs. of Lorain Co. at the next meeting on December 2.

Steubenville, O.—The City Council has passed a resolution authorizing the improvement of Ridge Ave., from Brady Ave. to McDowell Ave., and Wildon Ave., from Market St. to Ridge Ave., by the construction of a firebrick pavement with necessary curbs and sidewalks.

Akron, O.—Sealed proposals will be received by the Bd. of Co. Comrs. of Summit Co. until 11 a. m., Nov. 25, 1912, for the construction of the superstructure of the State St. bridge over the canal at Barborton.

American Good Roads Congress and Ninth Annual Convention

OF THE

AMERICAN ROAD BUILDERS' ASSOCIATION

WILL BE HELD AT

MUSIC HALL, CINCINNATI, OHIO
December 3, 4, 5 and 6, 1912

THE Conventions of the American Road Builders' Association are held for the purpose of discussing practical questions in relation to highway construction and maintenance only. There is no doubt that at the Convention held last year in Rochester, N. Y., there was present a larger number of real road builders—highway officials, engineers and contractors—of the United States and Canada than has ever attended any other similar convention held anywhere in the world either before or since that time. It is certain that the Convention at Cincinnati this year will surpass, in attendance, importance and interest, the Convention held last year at Rochester.

An Exhibition of Machinery and Materials for Road and Street Building

will be held in connection with the Convention. The number of applications for space already received makes it certain that this important and instructive feature will surpass in interest and size any similar exhibit in the history of the industry.

Every highway official, engineer and contractor is cordially invited to be present.

AMERICAN ROAD BUILDERS' ASSOCIATION

150 NASSAU STREET

NEW YORK, N. Y.

GOOD ROADS²¹⁵

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Number
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Good Roads Meeting at San Antonio, Texas

A good roads meeting was recently held in San Antonio, Texas, and the matter of constructing a highway between San Antonio and Corpus Christi, a distance of about 150 miles, was discussed.

W. G. Blake, Secretary of the Corpus Christi Board of Trade, submitted a report on the proposed highway, in which he stated that Corpus Christi had always been interested in building the highway, and that he believed the citizens of Corpus Christi had shown their interest by the amount of work they had done on what is known as the "up-river road," running between Corpus Christi and Borden's Ferry. On this road, which is of shell, the grades have been cut down and the hollows filled, and at present a part of it is being made into a sand-clay road. Mr. Blake recommended the construction of a bridge at Borden's Ferry, and said that the two counties which it would connect, San Patricio and Nueces, had agreed upon a basis whereby the bridge could be erected. The people of San Patricio County, according to his report have mapped out about 160 miles of roads to be hard surfaced with gravel. These roads have been so selected as to serve every town in the county on all three railroads entering Corpus Christi, and they all lead to the best farming districts and to the county seat. In addition to these roads it is proposed to build a causeway connecting San Patricio and Nueces Counties at the junction of Nueces Bay and Corpus Christi Bay. A bond issue of \$600,000 is estimated to be necessary to complete the plans as outlined. Mr. Blake stated that a petition of the county commissioners calling for this election would probably be presented at the next meeting, on November 11. Should all this work be carried out, Mr. Blake stated, there would be four different roads by which Nueces County could be entered, one over the causeway from San Patricio, one over the bridge where Borden's Ferry now is, one over the bridge at Bluntzer, and one through Alice in Jim Wells County, following the Texas-Mexican Railroad into Corpus Christi.

It was announced at the meeting that good progress was being made in the construction of a highway between San Antonio and Port O'Connor, a distance of about 135 miles. The first stretch of this road out of Port O'Connor, 37 miles long, has been finished, as has also a 30-mile connecting stretch running through Victoria County. These two divisions are built of shell. It is stated that from Cuero the road to San Antonio will diverge, one road to go by way of Yoakum, Gonzales and Seguin while the other division will run from Cuero by Nixon, Stockdale, Sutherland Springs and Lavernia to San Antonio.

In the report of the progress which is being made in the construction of the proposed highway between San Antonio and Laredo, a distance of 150 miles, it was announced that the first 30 miles of this highway would soon be finished. Reports were also made as to the progress of plans for the construction of other roads in the vicinity of San Antonio.

State Senator H. B. Terrill, of West, who was the author of a bill, introduced in the last Legislature, providing for the establishment of a state highway commission, addressed the meeting in favor of that proposition.

George D. Marshall, of the United States Office of Public Roads, and Congressman James L. Slayden also spoke.

Resolutions were adopted recommending the creating of a state highway department headed by a non-partisan, non-political commissioner, who shall elect a state engineer, supervise the work of the state highway department, and provide permanency and continuity of policy and organization for the working force of the department. The resolution recommends that it shall be the duty of the state highway department to prepare plans and specifications for road and bridge work, to give advice and assistance to counties, and to require that the work done under bond issues shall come up to a required standard. It recommends that the state highway department prepare data, make public reports from time to time and give other information of value to the public. Other resolutions adopted recommend that the work of the county be placed in the hands of a competent and experienced road engineer or supervisor, and that he be subject only to the orders of the county commissioner. Where the county is small and the road expenditures are too light to justify the employment of such a road engineer, it is recommended that the state highway department have the authority to combine two or more counties to form a district which shall employ a road engineer. The county or district road engineer shall work in harmony with the state highway department and furnish such reports as shall be required and as may be prescribed by law.

A resolution was passed indorsing the employment of state convicts in the construction of highways, and recommending that the Legislature authorize the governor, the penitentiary commissioner, and the state highway department to prepare and put in execution plans for the use of state convicts on the public roads. In this connection it is recommended that the state own and operate rock quarries and gravel pits in as many different localities in the state as suitable material can be found, and that the crushed rock and gravel from these plants be furnished free to the counties for road work.

The matter of publishing a good roads magazine in Texas was discussed, and the matter was referred to the president and secretary for such action as they might deem best. The secretary was instructed to have a conference with the state Superintendent of Public Construction to arrange, if possible, to have a day set apart as a good roads day in the public schools of the state.

Annual Convention of the Southern Appalachian Good Roads Association

The fourth annual convention of the Southern Appalachian Good Roads Association will be held November 20-21 at Atlanta, Ga.

The membership of this association is made up of citizens of seven states which lie wholly or partly within

the southern portion of the Appalachian mountain system. The States are Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Tennessee and Georgia.

Delegates from all these states and from portions of Alabama traversed by the southern Appalachian mountains are expected to be present at the convention.

Among the well known men interested in road building who are scheduled to address the meeting are Logan Waller Page, Director of the United States Office of Public Roads; P. St. Julien Wilson, State Highway Commissioner of Virginia; E. J. Watson, Commissioner of Agriculture of South Carolina; the Governors of some of the seven states, the State Geologists of Virginia, North Carolina, Tennessee, West Virginia and Kentucky, a number of members of Congress and some representatives of colleges and universities which have courses in highway engineering.

Among the subjects for discussion are: The Crest-of-the-Blue-Ridge Highway, the Memphis to Bristol Highway, the Bristol to Washington Highway, the Knoxville-Cumberland Gap-Cincinnati Highway, the Asheville-Spartanburg Highway and the Knoxville-Atlanta Highway. These are all interstate highways either contemplated or actually under construction. There will also be a discussion of the Central Highway of North Carolina, which is an intrastate proposition.

In a recent statement to the press outlining the tentative program of the convention, Dr. Joseph Hyde Pratt, State Geologist of North Carolina, and president of the Southern Appalachian Good Roads Association, placed particular emphasis on the Crest-of-the-Blue-Ridge Highway, calling attention to the grandeur of its scenery and to the fact that it will open up a section of country, remarkable for its attractive characteristics, to the tourists as well as giving an outlet to the citizens of the region.

The route of this proposed highway begins at Marion, Va., passes around White Top Mountain, and enters North Carolina via Ashe County. It then passes through Boone, Blowing Rock, Linville, Altapass, Little Switzerland, Asheville, Hendersonville, Brevard and Highlands, and enters Georgia probably via Rabon Gap, terminating at Tallulah Falls. The highest point of this road will be at Stepps Gap, where the altitude will be approximately 6,000 feet, and where the highway will be within 800 ft. of the top of Mt. Mitchell, the highest mountain peak east of the Rockies.

The Crest-of-the-Blue-Ridge Highway was described by Dr. Pratt at the recent road convention at Atlantic City.

The Coming Convention at Cincinnati

A thing that adds very much to the interest in the convention of the American Road Builders' Association, which is to be held in Music Hall, Cincinnati, Ohio, December 3-6, 1912, the success of which is already assured, is the fact of the great number of manufacturers who have already taken space for exhibition purpose.

There is every promise that this will be the largest and most comprehensive exhibition, both in the number and in the variety of exhibits that has ever been held in connection with a good roads convention.

Added interest will be provided by the exhibits of the different states. A large number of prominent cities will also be represented. Among the latter is the city of New York, which will have an exhibit representing each of the five boroughs which make up the greater city. This exhibit will consist of maps showing pavements in the city, organization charts of the street departments, charts showing statistics of various kinds of work done, and the like.

The United States Office of Public Roads will have a display and the road authorities of the District of Columbia have signified their intention of sending an exhibit.

The Ohio State University will make an exhibit of maps, drawings and reports and will show an outline of the engineering course in the university. This exhibit will be made in conjunction with that of the State Highway Commission.

The invitations of the Mayor of Cincinnati asking the mayors of other cities to appoint delegates to the convention have met with ready and generous response all over the country, and there is every indication that the attendance will surpass that of any previous meeting of this nature in the history of road building.

The Cincinnati Chamber of Commerce has organized a joint committee for the entertainment of the delegates to the convention, and practically every business and civic organization in the city will be represented on this joint committee.

The arrangement of the entertainment program is already well under way.

Organization of Road Officials in Tazewell County, Illinois

At a recent meeting of township highway commissioners and town clerks of Tazewell County, Ill., held at the Court House in Pekin, an organization was formed, according to reports, for the purpose of "protecting" its members.

The aims of the organization as outlined by Elmer O. Neef, Town Clerk of Pekin, and others, are to oppose a proposed law providing for placing road building under state supervision, in which case an overseer would have direct charge of the work in each county. This, according to B. F. Staymates, of Clinton, a former member of the Legislature, would mean the legislating out of office of the highway commissioners. Although Mr. Staymates expressed himself as in favor of good roads, he was opposed to the proposed change in the method of administration.

Elmer O. Neef, Town Clerk of Pekin, was elected president, and R. F. Brecher, of Groveland, secretary. An executive committee, consisting of Highway Commissioners F. M. Russell of Tremont, Chris Vaupel of Elm Grove, John Hapeney of Malone, John Luick of San Prairie and J. M. Shirts of Delavan, was appointed to represent the organization before legislative committees at Springfield, if such procedure is found necessary. It was also voted to hold another meeting on Nov. 16.

An interesting exhibit was conducted by the Minnesota State Highway Commission under the direction of George W. Cooley, State Engineer, at the State Fair, held in September. The exhibit illustrated the construction of roads of all kinds from the old Indian trail through the various processes of the old and new methods of grading and turnpiking to the improved road of gravel, macadam, concrete, brick, etc., as built at the present day. Models of steel, stone and concrete bridges and culverts were also shown. The road exhibits included illustrations of the methods of construction of the old Roman road, the Appian Way, and the earlier English roads. The roads were built of natural material, on a scale of one inch to the foot, the entire exhibit being about 200 ft. long.

Mayor I. E. Huffman of Tucson, Ariz., has appointed a committee of three to investigate the kinds of pavement most suitable to the climatic conditions to which Tucson is subjected. City Engineer W. H. Thompson, a member of the committee.

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SHORTSIGHTED OPPOSITION TO PROGRESS IN ILLINOIS

On another page of this issue there appears an account of the formation of an organization of the township highway commissioners and town clerks of Tazewell County, Illinois, for the purpose of actively opposing proposed legislation providing for placing road work under the supervision of the state.

Under the present Illinois highway law, there are two systems of highway administration in force in the state, some of the counties operating under what is known as township organization by which work is in charge of township officials, and the remainder of the counties operating under a system by which the work is in the hands of county commissioners. By the first named system, under which Tazewell County operates, highway work in each town is in the hands of three township commissioners of highways, who are elective officers. Elections are held in April, one commissioner being chosen each year to hold office for three years. The compensation granted these commissioners amounts to \$2.00 for each day on which they are necessarily employed in the performance of their duties.

The avowed purpose of the organization, if the reports that reach us are to be believed, is to oppose the suggested legislation by appearance before legislative committees at Springfield, if such is deemed desirable when the matter comes up, and by other means. So far as is shown by the information available, the only reason advanced for the attitude of the officials concerned is that the proposed change in the administration of highway work in the state would "legislate them out of office." While, of course, this is a good and sufficient reason from the point of view of each of the township highway commissioners, and perhaps to a lesser degree from that of the town clerks, it seems indefensible on any grounds except those of self-interest on the part of these officials.

There have been few, if any, instances in which the transfer of authority over roads from petty local officials to a central state authority has proven anything but an improvement. There has been one case in which a state established a state highway department and, after a short period of operation, abandoned it and went back to the old

system; but in that case the retrogression was caused, it is generally understood, primarily by a situation of a political nature and not unlike that in Tazewell County.

The present trend in the administration of highway affairs is toward greater centralization, with the standardization naturally following upon such concentration of responsibility and authority. Obviously, a central authority is better fitted—and more disposed—to plan a highway system which will serve the needs of both the state at large and the local communities in the most efficient manner possible than are numerous local authorities, each of which is working with a view to the advantage of its own community and without reference to its neighbors. Besides the advantage of a system physically better suited to the requirements of a state as a whole, there are many other advantages which may reasonably be expected through the administration of road affairs by a central authority. Among these are that under such administration the work can usually be done more cheaply, standard methods of construction can be determined upon without a multiplicity of more or less costly experiments, and, as a rule, overhead charges for administration and engineering can be materially reduced.

Everything considered, the mildest possible characterization of the position taken by such of the township highway commissioners of Tazewell County as are responsible for the reported action is that it is both shortsighted and against public interest. It is shortsighted because, though if successful it would result in their retaining office, with the \$2.00 a day pittance, for as many days during the year as they could manage to put in, yet, in the end would probably work to their disadvantage rather than to their advantage. It is against public interest because it would, if successful, prevent the adoption of the system insuring the most efficient administration of road affairs in the county. The greatest personal advantage which any one township highway commissioner might reap from a successful effort to keep conditions as they are now, would be the retention of office for three years, during which time he might receive a maximum of about \$1,800 in salary. As against this should be put the benefits which could reasonably be expected to accrue to the community at large through changed conditions, which, likewise reduced to a dollars and cents basis and calculated for the whole state, for Tazewell County or, perhaps, for even one single township, would amount to a great deal more than that sum.

It is stated that the county highway system of Dallas County, Alabama, which was mapped out by W. S. Keller, the present State Highway Engineer, several years ago when he was road Engineer of Dallas County, will be practically completed by the beginning of next year. During the past four years, it is stated, the county has expended \$400,000 on its road system, the money being obtained from two bond issues and from the county road tax. The present road engineer of the county is W. E. Thomas.

Concrete pavements having a total length of 4,200 ft. have recently been completed on three of the residence streets of Charlotte, Michigan, the work having been done by the city under the supervision of the Paving Committee and the Street Commissioner. It is said that by doing the work in this manner, instead of by contract, it has been done at a cost of \$18,000 instead of \$30,000, the amount of the original assessment, and that the \$12,000 saved will be returned to the owners of property on the streets paved.

Coming Meetings

Nov. 19-22.—American Civic Association.—Annual Convention, Baltimore, Md. Secy., Richard B. Watrous, Union Trust Bldg., Washington, D. C.

Nov. 20-21.—Southern Appalachian Good Roads Association.—Fourth Annual Convention, Atlanta, Ga. Secy., H. B. Varner, Lexington, N. C.

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Personal Notes

Charles Dew of Asheville, N. C., has been appointed Highway Engineer of Mobile County, Ala.

The County Fiscal Court of Hardin County, Ky., has elected A. J. Halbert County Road Engineer, with headquarters at Elizabethtown.

Philip C. B. Harvey, of Calgary, Alta., has been appointed Superintendent of the Dominion Parks, with headquarters at Edmonton, Alta.

Mandes Golder has been appointed Assistant Engineer of the Bureau of Surveys of Philadelphia, Pa. Mr. Golder was formerly inspecting engineer on the Penn Street viaduct at Reading, Pa.

Fred D. Hoogstra, of Ravenna, Mich., who has been Road Commissioner of Muskegon County since 1894, died at his home November 6. Mr. Hoogstra was well known throughout the western part of the state in connection with his work on the roads.

General Notes

Myrtle Avenue, in the Borough of Queens, New York City, is to be widened from the Brooklyn borough line to Cooper Ave., Glendale, a distance of $1\frac{3}{4}$ miles. The street is to be paved with old granite block, split and redressed, and improved granite block on a concrete foundation. The road will be widened by taking $2\frac{1}{2}$ ft. from the sidewalk on each side of the roadway.

Road improvement bonds have been issued in Washington County, Pa., to the amount of \$100,000. The bonds will be sold at the office of the County Commissioners in Charleroi, November 20.

Jackson County, Michigan, has nearly \$75,000 available for road work, and it is stated that the Board of County Road Commissioners is planning to utilize county prisoners in the performance of the work.

Contracts have been awarded by the County Commissioners' Court of Orange County, Texas, for the construction of approximately 58 miles of public roads under the recently authorized \$200,000 road bond issue.

The municipal asphalt plant at Niagara Falls, N. Y., which was installed early in the current year, was operated for five months, and during that time furnished asphalt used in laying 12,243.9 sq. yds. of repair paving at a gross cost of 77 cents per yard.

A highway 130 miles long connecting Alexandria with Cairo, Egypt, was completed and thrown open to travel early in October of the current year. This is the only through highway between the two cities, although many of the towns lying between the two points are connected by roads.

The Bureau of Standards, Department of Commerce and Labor, will occupy a space at the Pittsburgh Cement Show, December 12-18, 1912, and also at the Chicago Cement Show, January 16-23, 1913, and will have an elaborate exhibits of cement test prices and apparatus used in testing cement. The exhibits will also show the standard methods of analyzing cement, and many instruments and pieces of apparatus illustrating the scope of the Bureau's work.

The State Highway Commission of Minnesota has ordered the construction of 159.75 miles of new highway at a total estimated cost of \$213,370. The work includes 52.50 miles of gravel road in Itasca County, to cost \$100,201; 82.50 miles of earth road in Koochiching County, to cost \$91,950, and 24.75 miles of gravel road in Olmsted County, the cost of which will be \$21,220. A large number of petitions have been received by the Commission, which will not be granted on account of lack of revenue.

The city of Nacodoches, Tex., has adopted the front foot paving system. This action was taken by the voters at the recent election, and the result will permit the expenditure of \$90,000 in street paving.

A survey a little over a mile in length, extending from Lambertville to the Mercer County line in Hunterdon County, N. J., has been made by direction of the county officials, and the result submitted to State Highway Commissioner Stevens. This is the first link of the proposed Delaware Valley Highway between Trenton and Port Jervis, N. Y.

According to a statement in a recent issue of the "Daily Consular and Trade Reports," the introduction of automobile transportation for the thousands of annual visitors to Palestine awaits only a general system of road improvement. Some attention has been given to road building in this district of late, but the methods employed are crude and roads are not well built. With the exception of a 10-ton road roller and a stone crusher imported from the United States last year, there is no modern equipment available.

A general remodeling of many of the old streets of Naples is being conducted by the Societa del Risanamento di Napoli, which was organized in 1885, under the auspices of the municipality and the Italian government. The organization has reconstructed Via Marina by raising the surface 10 ft. above sea level, and has also widened and raised Via Mezzocannone, opened new streets in the sections known as Porto and Pindino, and raised old streets and leveled them with the higher section of the city in these districts. A new street has been built in Sezione Mercato, thus joining Via Puomo to Via San Giovanni a Mare.

The Board of Supervisors of Riverside, Cal., in accordance with a resolution recently passed providing for the appointment of a highway commission, has designated W. B. Clancy, of the Citizens' National Bank of Riverside, former Mayor S. C. Evans and A. F. Cole as members of the commission. The board is now contemplating the building in the near future of 12 miles of paved highways, including $1\frac{1}{4}$ miles connecting the Wineville and Ontario roads, a 3-mile extension of the Box Springs Grade road in the direction of Alessandro, a 4-mile strip leading through the Bernassoni Pass, and a $1\frac{1}{2}$ mile extension of Magnolia Ave.

CONTRACT NEWS

CONTRACTS PENDING
Roads and Streets

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11-18 Sacramento, Cal., State highway work	11-19
11-19 Cleveland, O., sts. & sidewalks	11-16
11-19 Harrisburg, Pa., state road work and brick pavement	11-16
11-20 New York, N. Y., street work	11-16
11-21 Shelbyville, Ind., gravel road	11-2
11-22 Topeka, Kan., brick paving	11-2
11-22 Cincinnati, O., county rd. work	11-16
11-22 Cincinnati, O., city st. paving	11-16
11-25 Los Angeles, Cal., asphalt pav.	11-16
11-25 Houston, Tex., bitulithic paving	11-16
11-26 Ashland, Ala., road constr.	11-16
11-29 Cincinnati, O., county rd. work	11-16
11-30 Oxford, Miss., county rd. work	11-16
12-2 Pikeville, Ky., st. paving	11-9
12-3 Ocala, Fla., paving	11-16
12-3 Columbus, O., brick paving	11-16
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11-20 Chicago, Ill., bridge superstruc	11-9
11-20 Chicago, Ill., bridge superstruc	11-16
11-21 Iola, Kan., stone or conc. bridge	11-16
11-25 Little Rock, Ark., viaduct	11-16
11-25 Akron, O., bridge superstruc	11-9
11-26 Washington, D. C., steel bridge	11-9
12-1 Terra Haute, Ind., two concrete bridges	11-16

MISCELLANEOUS.

11-19 Cincinnati, O., bonds	11-16
11-20 Lincoln, Neb., bonds	11-16
11-20 Cincinnati, O., street bonds	11-2
11-22 Cincinnati, O., lengthening culvert and macadam	11-16
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ROADS AND STREETS.

Bids Asked and Prospective Work.

Ashland, Ala.—Bids will be received by the Court of Co. Comrs. of Clay Co. at the Court House, Ashland, Ala., Nov. 26, for the construction of a graded road. W. S. Keller is State Highway Eng.

Los Angeles, Cal.—Bids will be received by the Bd. of Spvrs. up to Nov. 25, for the construction of drains and asphalt paving on the grounds of the county hospital on Mission Road.

Engineer P. H. Albright, Realty Bld., will receive bids soon for the moving of 125,000 cu. yds. of earth to level a 90 acre tract near Lafayette Sq. The tract will also be improved with the construction of streets.

San Francisco, Cal.—Property owners have been authorized to improve the following streets by private contracts: Curbing and paving Divisadero St., between Greenwich and Lombard Sts.; curbing and paving Santa Marina St., between Gladys and Mission Sts.

Secretary Churchill of the Bd. of Pub. Works, has informed the Supervisors of San Mateo Co. that there is a budget provision of \$75,000 for the improvement of San Bruno roads, which will connect with one of the main roads of San Mateo Co.

A chemically treated wooden block pavement is to be laid in First St., between Market and Mission Sts.

The Woodside Tract Company has informed the Bd. of Works that it is about to improve property between Fifteenth and Twelfth Aves. and R and S Sts., and has asked that the city specify how the works shall be done.

The Public Works Bd. has directed the City Eng. to prepare an estimate of the cost of paving First St., between Market and Mission, with wooden blocks.

Santa Monica, Cal.—The San Vicente Boulevard Improvement Association, has been organized for the purpose of securing the construction of pavements, sidewalks and ornamental posts on five miles of that thoroughfare. James R. H. Wagner is pres.

Ocala, Fla.—Bids will be received Dec. 3 for the construction of 4,000 sq. yds. of paving. Address M. C. Sistrunk, City Clerk.

Dixon, Ill.—The Bd. of Loc. Imps. passed a resolution for the construction of brick pavement and concrete curb where it is needed, on Third St., from the west line of Galena Ave. to the west line of Douglas Ave.

Sterling, Ill.—The Twp. will expend \$35,000 for paving roads with brick. Address Twp. Clerk.

Council Bluffs, Ia.—The Commercial Club is planning to pave over one mile of South Ave. Address Mayor Maloney.

Kansas City, Kan.—The following ordinances have been passed by the City Council: Providing for the curbing of New Jersey Ave., between 7th and 8th Sts., the material to be designated hereafter; providing for the curbing of New Jersey Ave., between 8th and 9th Sts.; providing for the paving of New Jersey Ave., between 9th and 10th Sts., and providing for the curbing of New Jersey Ave., between 10th and 11th Sts.

A resolution has been adopted by the Bd. of Commissioners, declaring it necessary that Ridge Ave., between 10th and 11th Sts. be paved with concrete pavement six inches thick for a width of 26 ft.

Topeka, Kans.—Specifications are being prepared for paving several streets. W. G. Tandy is Street Commissioner.

Dayton, Ky.—The city officials are planning to expend \$20,000 for paving with brick. Address City Clerk.

Oxford, Miss.—The road commissioners of Lafayette Co. will receive sealed bids until noon, Nov. 30, for building 25 miles of roads in accordance with plans and specifications on file at the office of the commissioners. About 15 miles of these roads will be surfaced with gravel macadam. Standard reinforced concrete bridges and culverts will be included or can be bid upon separately. There is much sand clay grading to be done.

Doniphan, Mo.—The Bd. of Aldermen, will receive bids for the construction of four new granitoid sidewalks here. Address, Buell Cable, Clerk.

Huntington, N. Y.—The Town Bd. has decided to make street improvements costing \$34,000 during the coming year.

New York, N. Y.—Sealed bids will be received by Alfred E. Steers, Pres. Boro. of Brooklyn, in his office, Room 2, Boro. Hall, until 11 a. m., Nov. 20, 1911, for the following street work: regulating, paving and repaving with permanent asphalt pavement on a six-in. concrete foundation the roadway of Alabama Ave., from Pitkin Ave. to Glenmore Ave.; regulating and paving with permanent asphalt pavement on a six-in. concrete foundation the roadway of Church Ave., from the east side of New York Ave. to the east side of Brooklyn Ave.; regulating and paving with preliminary asphalt pavement on a four-in. concrete foundation the roadway of E. 7th St., from Beverly Road to Avenue C; regulating and paving with preliminary asphalt pavement on a four-in. concrete foundation the roadway of E. 26th St., from Clarendon Road to Canarsie Lane; regulating and repaving with asphalt on a concrete foundation the roadways of Elmore Place, from Foster Ave. to Farragut Road, and Kenmore Place, from Foster Ave. to 377 feet north of Avenue G; regulating and paving with permanent asphalt pavement on a six-in. concrete foundation the roadway of Malbone St., from New York Ave. to Nostrand Ave.; regulating and repaving with grade 1 granite on a concrete foundation the roadway of Prospect St., from Fulton St. to Washington St.; regulating and paving with preliminary asphalt pavement on a four-in. concrete foundation the roadway of W. 16th St., from Neptune Ave. to Canal Ave.; regulating, grading, curbing and laying sidewalks on W. 33d St., from Neptune Ave. to Surf Ave.; regulating and paving with preliminary asphalt pavement on a four-in. concrete foundation the roadway of 41st St., from 16th Ave. to West St.; regulating and paving with preliminary asphalt pavement on a four-in. concrete foundation the roadway of 42d St., from New Utrecht Ave. to 13th Ave., and from 14th Ave. to West St.

Akron, O.—An ordinance was passed to issue bonds in the sum of \$7,883 to pay the corporation's part of improving certain streets by sewerage and paving.

An ordinance was passed to levy special assessments for the improvement of South St., from the Manchester Road to Bowery St. and Taylor St., from Thornton St. to South St. by constructing a sewer therein.

Athens, O.—An ordinance was passed to levy special assessments for the improvement of Grand Ave., from Portage Path to Exchange St. by grading, etc.

Cincinnati, O.—Sealed proposals will be received by the Bd. of Co. Comrs. of Hamilton Co. at their office in Cincinnati, until noon, November 29, 1912, for the improving of Hoffer Ave., from Cheviot Road to Blue Rock Pike in Colerain Twp. Stanley Struble is Pres. of the Bd.

Sealed proposals will be received at the office of the Bd. of Co. Comrs. of Hamilton Co. at Cincinnati, until noon, Nov. 22, 1912, for lengthening, graveling and macadamizing over the new fill on the Toph Road, north of Harrison Pike in Whitewater Twp.

Sealed proposals will be received by the Bd. of Co. Comrs. of Hamilton Co., at Cincinnati, until noon, Nov. 29, for building a culvert on the Foley Road, near Trenton Ave. in Delhi Twp.

Sealed proposals will be received by the Bd. Co. Comrs. of Hamilton Co., until noon, Nov. 29, for building a culvert in Snake Hollow, and repairing slip on Shady Lane through the lands of Maurer in Miami Twp.

Sealed proposals will be received at the office of the Bd. of Co. Comrs. of Hamilton Co., at Cincinnati, until noon, Nov. 29, for the improvement of Deerfield Road, from Madisonville Pike to the half section line of Section 17 in Columbia Twp. All the above work is to be done according to plans and specifications now on file in the office of the Bd. of Co. Comrs.

Sealed bids will be received at the office of the Director of Public Service at City Hall, until noon, Nov. 22, for the following street work: improving Knox St., between Thompson Ave. and Saturn St., by grading, setting stone curbs, and paving the roadway with brick, from Thompson Ave. to Scully Ave., and with bituminous macadam, from Scully Ave. to Saturn St., and constructing the necessary drains and inlets; improving Iowa St., from McGregor Ave. to its southern terminus by constructing cement curb and paving the roadway with bituminous macadam; improving Innes Ave., from Bruce to Frederick Aves., by grading, setting stone curbs, paving the roadway with brick, and constructing the necessary drains and inlets; improving Neave St., between West Sixth St. and Staebler St., by paving with granite block pavement; improving Liberty St., from a point 120 ft. west of the west curb of Manss Ave. to the east curb of Rosemont Ave., by grading, setting granite curb, paving the roadway with Hillside brick, and constructing the necessary drains and inlets; improving Denver (formerly Neff Ave.), between Wilder Ave. and Maxwell Pl., by paving with bituminous macadam; improving Sauer Ave., from Warner St. to a point 200 ft. south of Parker St., by paving with brick; improving Colerain Ave., between Bank St. and Harrison Ave., by paving the roadway with stone block pavement; improving Court St., between Sycamore St. and Broadway, by paving the roadway with granite block pavement.

Plans, specifications and blank proposals may be obtained at the office of the Chief Engineer, Department of Public Service. V. T. Price is Director of Public Service.

The following ordinances have been passed by the City Council: Determining to proceed with the improvement of Goose alley, between Elder and Findlay Sts., by paving the roadway with brick and constructing the necessary drains and inlets; determining to proceed with the improvement of Noah alley, between Pendleton and Frank Sts., by paving the roadway with brick and constructing the necessary drains and inlets.

Sealed proposals will be received at the office of the Director of Public Service at City Hall, until noon, Nov. 20, for improving the right of way, from Conklin to Polk Sts., by constructing reinforced concrete steps and the necessary appurtenances. Plans and specifications on file at the office of the Chief Engineer, Department of Public Service. V. T. Price is Director of Public Service.

Cleveland, O.—Sealed bids will be received by H. H. Canfield, Clerk of the village of Cleveland Heights, at his office at the Town Hall, or at his office at 309 Beckman Bldg., Cleveland, O., until noon, Nov. 19, for furnishing the material and labor necessary for the improvement of Colonial Drive, between the center line of Oak Road and the north line of Euclid Heights Blvd., by establishing the grade, and grading, draining and constructing sidewalks in accordance with plans and specifications on file at the office of the Village Clerk, at the Town Hall, and at

the office of the F. A. Pease Engineering Co., at 921 Williamson Bldg., Cleveland, Ohio.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Commissioner, at Columbus, until 2 p. m. December 3, for grading and paving with brick for heavy traffic the Ravenna Youngstown Road in Palmyra Twp., Portage Co., length, 11,960 ft.; width, 12 ft. Estimated cost of construction, \$28,926.73. Plans and specifications are on file in the office of the County Commissioners of Portage Co., and the State Highway Department at Columbus. James R. Marker is State Highway Commissioner.

The following ordinances have been passed by the City Council: Determining to proceed with the improvement of Poplar Ave., between Neil and Michigan Aves., by grading, draining, curbing and laying water pipe service; declaring it necessary to improve Almond Alley, between Jefferson and Lexington Aves., by grading, draining and paving the roadway full width with brick in accordance with plans and specifications prepared by the chief engineer, determining to proceed with the improvement of Summit St., between Hudson St. and Indianola Blvd., by grading, draining, curbing and paving the roadway with asphalt or brick and laying water service pipe; determining to proceed with the improvement of Deming Ave., between Blake and Arcadia Aves., by grading, draining, curbing and laying water service pipe; determining to proceed with the improvement of Kossuth St., between High and Bank Sts., by grading, draining, curbing and paving the roadway with asphalt or brick; determining to proceed with the improvement of Medary Ave., between Deming and Arcadia Aves., by grading, draining, curbing, and paving the roadway with asphalt or brick, and laying water service pipe; determining to proceed with the improvement of 19th St., between Bryden Road and Main St., by grading, draining, curbing and paving the roadway with asphalt or brick and laying water service pipe.

Dayton, O.—An ordinance has been passed authorizing the levying of a special assessment for the improvement of Daller St., from the alley north of Kiefer St. to Ray St., by grading and graveling the roadway and setting a boulder border.

Newark, O.—An ordinance was passed determining to proceed with the improvement of Elmwood Ave., from Log Pond Run to Shields St., by paving and curbing the roadway thereof.

Toledo, O.—An ordinance has been passed determining to proceed with the improvement of Seneca St., between Cherry and Lagrange Sts., by grading and paving 36-ft. wide with either vitrified bricks, sand stone or granite blocks laid on a foundation of concrete, also constructing the necessary curbing, retaining walls, drainage, etc.

An ordinance has been passed levying a special assessment on real estate bounding and abutting on Heaton St., between Dorr St. and Avondale Ave., for the improvement of Heaton St., between those points by grading and paving with Westrumite paving, 24 ft. wide, laid on a 4-in. concrete foundation with a Berea curb.

Youngstown, O.—An ordinance has been passed levying special assessments for the construction of sidewalks on Hensley St., between Williamson Ave. and Delanson Ave.; Tod Ave., between Johnson St. and Irving Pl.; Fleming St., between Federal St. and end of street; Mercer St., between Plum St. and Edwards St.; Wick Ave., between Linden Ave. and Thornton Ave.; Canton St., between South Ave. and Bellview Ave.; Jackson St., between Sheehy St. and Oak St.; Waverly Ave., between Salt Spring St. and Division St.; Elm St., between Thornton Ave. and the city limits.

An ordinance has been passed determining to proceed with the improvement of Hazel St., between Boardman and Front Sts., by repaving the same.

Harrisburg, Pa.—Sealed proposals will be received at the office of the State Highway Department in the Capitol Bldg., Harrisburg, Pa., until 10 a. m., Nov. 19, for the reconstruction of 4,588 lin. ft. of brick block paving, 16 ft. wide, running from the Charleroi borough line at Maple Creek, Station 59+40, to the intersection of Speers and State Sts., in Speers Borough, Washington County, Station 105+280. Plans and specifications can be seen at the office of the State Highway Department at Harrisburg; 1001 Chestnut St.,

Philadelphia, Pa.; 2117 Farmers Bank Building, Pittsburgh, and at Washington, Pa. Edward M. Bigelow is State Highway Commissioner.

Pittsburgh, Pa.—An ordinance has been passed authorizing the grading, paving and curbing of Winterburn Ave., from a point 150 ft. south of Farnsworth St. to Bigelow St., by grading, paving and curbing.

An ordinance has been passed directing the grading, paving and curbing of Mulford St., between Hamilton Ave. and Oakwood St.

Scranton, Pa.—The following ordinances have been passed by the City Council: Authorizing the grading, paving and curbing of Phelps St., from Capouse to Washington Aves.; providing for the extension of the Luzerne St. culvert in the 5th and 21st wards; providing for the laying of flagstone sidewalks on both sides of Ash St., between North Washington and Jefferson Aves., also on both sides of Adams Ave., between Myrtle and Ash Sts., in the 9th ward; providing for the laying of 3 ft. flagstone sidewalks on both sides of Fordham Court, from New York to Marion Sts., in the 13th ward; providing for the laying of flagstone sidewalks on both sides of Ferdinand St., between N. Main and Brick Aves.; authorizing the grading, paving and curbing of Mifflin Ave., between Linden and Mulberry Sts., in the 16th ward.

A resolution has been passed by the Council of the city of Scranton authorizing the Director of Public Works to construct a concrete curb along the southerly side of Electric St. from the intersection of Electric St. and Washington Ave., extending along Electric St. for a distance not exceeding 150 ft.

Arlene, Tex.—The city is preparing to improve 7 miles of roads with macadam. H. J. Bradshaw is City Eng.

Houston, Tex.—Sealed bids will be received at the office of Dan C. Smith, City Controller and City Secretary, until noon, Nov. 25, for grading and paving McGowan Ave., between Milam and Albany Sts., the material to be bitulithic paving on five inch concrete. Specifications to be obtained at the office of F. L. Dormant, City Engineer.

Waco, Tex.—A petition has been presented to the City Comrs. asking that Columbus St. be paved with some durable material, between the southwest line of Sixth St. and the northeast line of 23d St. The petition was granted on recommendation of the Street Commissioner.

Richmond, Va.—At a recent meeting of the mayor and city officials it was determined to ask the city engineer's department to have the territory leading from 15th St. through to Broad and that leading from 14th through Mayo, Ross, Governor and Capitol Sts. surveyed for the purpose of opening a street leading from the new bridge to Broad St.

Bellingham, Wash.—The city, upon the recommendation of the City Engineer and the Finance Committee, has adopted the plans submitted by the Bellingham Bay Improvement Company for the improvement of Meridian St., from Illinois St. to Squalicum Creek, by constructing two 9-ft. stretches of asphalt pavement and 5-ft. concrete sidewalks. A parking stretch, 8-ft. wide will be left in the center of the street to be kept in condition by the company.

BIDS RECEIVED AND CONTRACTS AWARDED.

Birmingham, Ala.—The contract for the construction of three miles of state aid road has been awarded by the Bd. of Revenue, to Young & Wallace, of Birmingham, at \$8,000.

Los Angeles, Cal.—The Hudson Johnson Construction Co., Hellman Bld., were the lowest bidders at about \$19,000 for improving a portion of Citrus Ave. The bids received by the Bd. of Spvrs. were as follows: Hudson-Johnson Construction Co. (a) 4,800 cu. yds. of excavation at 30 cts.; (b) 6,350 lin. ft. of shaping road bed for macadam at 7 cts.; (c) 7,966 ft. of shaping road bed for concrete paving, at 7 cts.; (d) 4,200 tons of macadam, at \$1.10 per ton; (e) 15,950 sq. yds. of concrete paving, at 49 cts. per sq. yd.; (f) 259.8 cu. yds. of class A concrete, at \$11; (g) 24,118 lbs. of steel at 5 cts.; (h) 100 ft. of guard fence, at 50 cts.; J. D. Marsh, (a) 50 cts. (b) 10 cts., (c) 10½ cts., (d) \$1.15, (e) 55½ cts., (f) \$11.50, (g) 4¼ cts., (h) 50 cts. Andrews Holloway, (a) 27½ cts., (b) 44 cts., (c) 36 cts., (d) \$1.60, (e) 48 cts., (f) \$11, (g) 2.1 cts., (h) 75 cts.

The following bids were received by the Bd. of Pub. Works for improving Canal St., Wilmington; Fairchild Gilmore

Wilton Co., 20 cts. per sq. ft. for asphalt paving; 30 cts. per lin. ft. for cement curb; 45 cts. per sq. ft. for granite block gutter; 11 cts. per sq. ft. for cement sidewalk; \$10,000 for storm sewers, storm drains and apertures. B. C. Nicols bid: 13.9 cts. for paving, 36 cts. for curb, 50 cts. for gutter, 12 cts. for sidewalk, \$9,250 for storm drains.

Redondo Beach, Cal.—The Fairchild-Gilmore-Wilton Co. was awarded the contract for the construction of an asphalt pavement on Pacific Ave., extending to Clifton-by-the-Sea. The Barber Asphalt Paving Company was awarded the contract for paving Catalina Ave. with Warrentite paving. The total amount of the contract reaches \$103,000.

Moscow, Id.—The following bids have been received by the City Council for street work: Inland Dolarway Paving Co., Spokane, Wash., 6-in. paving, \$136,772, and 5-in. Dolarway, \$127,104; Reliance Constr. Co., 6-in. Dolarway paving, \$144,180 and for 5-in., \$134,339; Inland Empire Hassam Paving Co., Spokane, Wash., 6-in. Dolarway, \$135,314, and for 5-in. paving, \$126,336; Wilson & Bailey, Walla Walla, Wash., 6-in. Dolarway, \$132,888, and for 5-in., \$124,601; Bird & Mendenhall, Salt Lake City, U., 5-in. Dolarway, \$123,390; Inland Hassam Paving Co., Spokane, Wash., 6-in. Hassam paving, \$151,398, and for 5-in., \$141,384; Federal Constr. Co., San Francisco, Cal., 6-in. Hassam, \$167,627, and 5-in. Hassam, \$155,769; J. F. Hill Paving Co., Spokane, Wash., asphaltic concrete paving, \$164,154; Federal Constr. Co., \$162,426; Inland Hassam Paving Co., asphaltic concrete, \$162,794; Barber Asphalt Co., of Spokane and Seattle, asphaltic concrete, \$166,828.

The contract for the construction of 69,062 sq. yds. of 6-in. Dolarway paving has been awarded to Bird & Mendenhall at \$1.28 per sq. yd.

Elgin, Ill.—The City Council has accepted the recommendation of the Bd. of Local Impts. to accept the bid of Logan & Glertz Constr. Co. for paving St. Charles St. with Barr brick on their bid of \$34,497.44.

Baltimore, Md.—The Bd. of Awards has awarded the following contracts for street work: Paving Bethel St., between Lancaster and Pratt Sts.; McMechen St., between McCulloh and Park Ave., and Brentwood Ave., between Biddle and Preston Sts., with vitrified blocks, and High St., from Front St. to the Falls, with granite blocks to the Standard Contracting Co., at \$30.215.50. Laying bituminous concrete on Chester St., between Lombard and Pratt; Collington Ave., between Baltimore and Pratt; Lombard St., between Chester and Washington, and Madison St., between Charles and Cathedral to the Filbert Paving and Constr. Co., at an aggregate cost of \$14,778.

Winona, Minn.—Prinz & Carlson have been awarded the contract for the county road work in Elwell at \$120,000.

Albany, N. Y.—State Supt. of Highways C. Gordon Reel, has awarded the contract for the construction of the Smithtown-Port Jefferson Road, 11.25 miles long, to the Standard Bitulithic Co., New York City, at \$222,234.80; for the construction of the Bay Shore-Brookhaven Road, 19.92 miles, to Charles V. Platt, Port Jefferson, at \$240,566. The construction of these highways has been held up for several months because some of the property owners were slow in granting rights of way.

New York, N. Y.—The following contracts have been awarded for street work in the borough of Queens: Regulating, grading and laying blue stone sidewalks in Jackson Ave., between Woodside and Steinway Aves., First Ward, J. F. Clancy, \$8,710; regulating, curbing and laying sidewalks on the north side of Polk Ave., between Alburts and Jamaica Aves., Second Ward, McBride & Callan, \$2,761.50; regulating, grading, curbing, recubing, flagging and reflagging and laying crosswalks in Graham Ave., between Vernon Ave. and Sherman St., First Ward, Astoria Contr. Co., \$6,085; regulating, curbing, grading and laying sidewalks in Sherman Ave., between Ridge St. and Grand Ave., First Ward, Astoria Contr. Co., \$10,550.50; regulating, grading and laying sidewalks on various streets in the Fifth Ward, William Crovello, \$4,195.05; regulating and grading the sidewalk spaces, curbing and laying sidewalks where not already laid to grade and in good condition in Jackson Ave., between Junction Ave. and 54th St., Second Ward, D. McCarthy, \$16,922.50; for laying sidewalks on Broadway, between Hoffman Blvd. and Cornish St., Second Ward, Freeman-Hess Co., \$740; regulating, grading, and laying sidewalks

on the north side of Myrtle Ave., between Onderdonk and Forest Aves., Second Ward, Peace Bros., \$130; regulating, curbing and laying sidewalks on Onderdonk Ave., between Willoughby Ave. and Elm St., Second Ward, Grady Bros., \$4,129.

Rochester, N. Y.—The following low bids have been received for street improvement: Grading Ellicott St., Frank Crouch, \$731; laying sewer, walks and grading in Gale Terrace, John Petrossi Co., \$4,001.50; laying brick pavement on Trust St., John Petrossi Co., \$6,314.20; grading and constructing walks on Millbank St., Frank Crouch, \$668.25.

Syracuse, N. Y.—The following proposals have been received for constructing street paving in Beverly Road: Guy B. Dickinson, vitrified block, \$8,393.60; asphalt, \$7,697.60; wood block, \$10,597.60; macadam, bituminous filler, \$7,117.60. Warner-Quinlan Asphalt Co., vitrified block, \$8,319.50; asphalt, \$7,785.90; wood block, \$10,755.50. F. J. Baker, vitrified block, \$8,209.80; asphalt, \$7,653; wood block, \$10,228.20; waterbound macadam, \$7,212.20.

The lowest bidders on other contracts were as follows: Grading Livingston St., from Euclid Ave. to Stratford St., Albert Gaffey, \$814; sidewalk on the north side of Genessee St., between Sand and Geddes, A Mondo and Cuspito & Lamanno, tied, at \$284.38; a sidewalk on both sides of Clarendon Ave., from Ackerman Ave. to Westcott St., Salt Lake Paving Co., \$954.90; sidewalks on both sides of South Salina St., from Onondaga St. to Adams St., J. G. Barr, \$497.95; a sidewalk on the north side of West Onondaga St., from South Salina St. to Clinton St., J. G. Barr, \$166.25.

Columbus, O.—The City Bd. of Control has awarded the following contracts for street work: Paving South High St., between Beck and Hanford Sts. with Trinidad asphalt, Andrews Paving Co., Hamilton, O., \$53,924, and paving West St., from the alley east of Yale Ave. to Central Ave., at \$12,232. The unit cost of the asphalt is \$1.86 per sq. yd. Paving Cole St., between Wilson and Kimball Sts., with Nelsonville block, J. C. Beaseley, \$6,042; Oregon Ave., between Second and Third Aves., brick, J. C. Beaseley, brick, \$3,599; Conklin St., from the alley west of Neil Ave. to Michigan Ave., brick, B. F. Patterson, \$6,795; Dessler Ave., from Parsons east to terminal, brick, J. C. Beaseley, \$6,476; Martin Ave., from Town to Sullivan, trimble block, W. M. Graham, \$5,999; Mt. Vernon Ave., from Neilston St. to Cleveland Ave., Portsmouth block, D. E. Sullivan & Sons, \$6,007; Sherman St., from Franklin Ave. to the alley north of Bryden Road, trimble block, S. T. Knight, \$1,328; High St., in Clintonville, Portsmouth block, D. E. Sullivan, \$2,884; Twentieth St., from Oak St. to Bryden Road, Harris block, S. T. Knight, \$3,962.

Dayton, O.—The low bid for paving the alley west of Gunckel Ave., between Margaret and Gephart, and that east of Wayne Ave., between Margaret and Gephart, was \$533.20 and \$571.90 respectively, submitted by Clifton Hoolihan.

The low bid for paving the alley south of Margaret St., from the alley east of Wayne Ave. to the alley west of Gunckel Ave. was \$586.30, submitted by G. R. Statelman.

The low bid for curbing and guttering Lorain Ave. and constructing sidewalks on that thoroughfare, between Brown St. and Linden Ave., was \$850, submitted by John Kirchner.

The low bid for curbing and graveling the walks on Leo St., from Troy St. west, was 80 cents per foot, submitted by E. M. Kiser.

Bellingham, Wash.—C. G. Burnett has been awarded the contract for the improvement of Elk St., between the north and south intersections of the boulevard with the street, at \$18,372.89.

BRIDGES.

Bids Asked and Prospective Work.

Clinton, Ark.—The County Court of Van Buren County has appropriated \$25,000 for the construction of 25 new county bridges.

Little Rock, Ark.—The opening of bids which were received November 8, for the construction of the new West Third St. viaduct, has been postponed to November 25, when the contract will be awarded.

Poyen, Ark.—A second steel bridge will be constructed in Grant Co. near Prattsville in the near future.

Napa, Cal.—The Spvrs. have ordered bids received for the construction of a bridge over Trancas Creek. Estimated cost, \$15,000.

Chicago, Ill.—Sealed proposals will be received by the city of Chicago, at City Hall, Room 406, until 11 a. m., Nov. 20, for furnishing all materials, tools, labor and appliances for the construction of the sub-structure of a bascule bridge over the north branch of the Chicago River, at Chicago Ave., including the removal of all obstructions found at the bridge site which might interfere with the erection of a new bridge. L. E. McGann is Comr. of Pub. Wks.

Hamilton, Ill.—The Hamilton, Warsaw and Keokuk Bridge Co. has been incorporated with a capital stock of \$1,000 for the purpose of constructing a bridge across the Mississippi River. Incorporators: Wm. A. Dodge, John Giller, and others.

Ottawa, Ill.—Clarence Griggs, of Ottawa, can be addressed concerning a \$22,000 bridge to be constructed across the Vermillion River by LaSalle Co. Bd.

Huntington, Ind.—The Council is planning to build another bridge across the river. Address, City Eng.

Madison, Ind.—Architects Hobbs and Dunn, State Life Bldg., Indianapolis, have prepared plans for the construction of a four span bridge at the Southeastern Hospital for the Insane. It will be reinforced concrete and steel and will cost \$7,000.

Terre Haute, Ind.—Bids will be received Dec. 1, by the Bd. of Co. Comrs., of Vigo Co., for the construction of two concrete bridges. R. E. Gibbons is Co. Surv.

Des Moines, Ia.—The Bd. of Spvrs. will spend \$100,000 in the construction of concrete bridges.

Atehison, Kans.—The Council is planning to build a viaduct at Tenth St. Address City Atty. Jackson.

Girard, Kan.—The Co. Comrs. of Crawford Co. have decided to appropriate sufficient money to erect a new bridge in Baker Twp. just outside the corporation limits of Pittsburg, Kan.

Iola, Kans.—Bids will be received Nov. 21 for the erection of a bridge crossing Sweet Branch, between sections 9 and 16, consisting of one stone or concrete span of 30 ft. or two double arches of 18 ft. each. Plans and specifications are on file at office of Co. Engr. Also for one bridge across Big Creek on the Allen and Neosho Co. line. Address, R. E. Culbertson, Co. Clerk.

Duluth, Minn.—The Park Com. is planning to build a bridge across the bay connecting West Duluth with Billings Park. Address, A. A. Campbell.

Cadiz, O.—The Harrison Co. Auditor will readvertise for bids for construction of 100-ft. steel bridge at Tippecanoe. O. C. Gray, auditor.

Cincinnati, O.—The project of a new viaduct at Queen City Ave., as proposed by Councilman John Eckert, was approved by the Council Com. on track elevation.

Cleveland, O.—Bids for the substructure of the new Clark Ave. bridge will be called for at once. Specifications are now nearing completion.

Columbus, O.—Plans are being completed by the city engineering department for the rebuilding of the Fourth St. viaduct. It is proposed to widen this thoroughfare 20 ft. and to remodel generally and strengthen its construction. Cost, \$200,000. Address City Engr.

Toledo, O.—Thirty-three thousand dollars has been appropriated to build a bridge at Sumner St. Address City Engr.

Pittsburgh, Pa.—The Pennsylvania Railroad is officially ready to proceed at once with its share of the work of eliminating grade crossings in Homeward and Wilkinsburg. The work of the elimination will be started promptly. Address, W. C. Cushing, Chief Eng., Pittsburgh, Pa.

Washington, D. C.—Bids will be received Nov. 26 for furnishing materials and labor for the erection of a riveted steel highway bridge across the Little Big Horn River, Crow Indian Reservation, Montana, in accordance with plans and specifications on file with C. F. Hauke, acting Commissioner, Department of the Interior, Office of Indian Affairs, Washington, D. C.

York, Pa.—A recommendation that a concrete bridge 80 ft. in width be built by the Co. Comrs. over the Codorus Creek at West Market St., in this city, was made by Viewers John W. Heller, Sr., U. S. Strine and W. F. Fry in their report.

Ft. Worth, Tex.—Funds have been set aside by the county commissioners for the building of two new county bridges.

San Angelo, Tex.—The contract for drafting plans and specifications for the construction of a concrete viaduct over the North Concho River at the foot of Chaddbourne St., has been awarded to C. M. Davis, of Fort Worth, the viaduct to be erected some time during 1913 at an estimated cost of \$50,000. Bids will be asked later.

San Antonio, Tex.—The Co. Comrs. have authorized the county road engineer to build a bridge over Salada Creek in the town of Southon. The cost will not exceed \$1,400.

Centralia, Wash.—The County Comrs. of Lewis Co. and the City Comrs. of Centralia have decided to build a new bridge over the Skookumchuck River west of Centralia. The bridge will be of steel, 24 ft. wide.

Milwaukee, Wis.—Plans for a new bridge on Buffalo St. are being prepared by Bridge Supt. Pinney.

Racine, Wis.—The Bd. Pub. Wks. has been instructed to proceed with the rebuilding of the west abutment walls of the State St. bridge. The estimated cost is between \$7,000 and \$9,000.

Sheridan, Wyo.—A second steel bridge will be constructed in Grant Co., near Prattsville, in the near future. Address, Co. Surv.

St. Boniface, Man.—The Council is planning the erection of a \$400,000 bridge at Provencher Ave. Address Mayor Berry.

Winnipeg, Man.—The Council is planning to build a \$20,000 bridge at Arlington St. Address Solicitor J. T. Haig.

Bids Received and Contracts Awarded.

Sacramento, Cal.—The Bd. Spvrs. of Sacramento Co. has awarded bridge contracts as follows: a bridge at Reese schoolhouse to A. McDonald for \$2,866.75; a bridge near Florin to the same contractor for \$1,760.50; Burton slough trestle to the same contractor for \$2,418.75.

San Jose, Cal.—The contract for the construction of a bridge over Dry Creek and Cleaves road has been awarded to John W. Williams at \$4,070.

A contract for the construction of a bridge over the Penitencia creek on the Milpitas and Alviso roads has been awarded to John Doyle at \$587.

Fresno, Cal.—A contract for the construction of a concrete bridge across Dry Creek at Forthcamp Ave. has been awarded to Hall & Hunt for \$4,300.

Alton, Ill.—The low bid for the construction of four concrete bridges in Godfrey Twp. was \$4,770, submitted by Joseph Klein, of Freeburg, Ill.

Galesburg, Ill.—The contract for the bridge over the Spoon River at London Mills has been awarded to the Decatur Bridge Co., of Decatur, Ill., at \$2,385.

Manhattan, Kan.—The contract for constructing the Tabor Creek bridge has been awarded to Victor E. Almgren.

Shreveport, La.—The Modern Steel Constr. Co., of Waukesha, Wis., has bid \$168,930 for the construction of the superstructure of the highway steel reinforced concrete bridge across the Red River between Shreveport and Bossier City. The bids were about \$3,000 less than the estimated cost. The superstructure which was recently finished cost \$83,000.

Baltimore, Md.—The Water Bd. has recommended that the contract for constructing a bridge at the new Loch Raven dam be awarded to Max Ways' Singer Pentz Constr. Co., at \$20,962.80.

Portage, Mich.—The contract for the construction of a reinforced concrete bridge across the Pilgrim River and also for one across the Otter River has been awarded to the Illinois Bridge Co., at \$2,144 and \$1,500 respectively. Construction will begin April 1.

Mt. Holly, N. J.—The Bd. Chosen Freeholders of Burlington Co. has awarded the contracts for the construction of two bridges, one at Broad St. and the other at Pearl St., to P. A. Hennessy, of Belvidere, for \$10,870 and \$14,840, respectively.

Buffalo, N. Y.—The following bid for the construction of a viaduct over Buffalo Creek railroad tracks and the ship canal on the Hamburg Turnpike, has been received by Francis G. Ward, Comr. of the Dept. Pub. Wks., the Eastern Concrete Steel Co., \$10,910.

Utica, N. Y.—The contract for the construction of a temporary bridge over the Mohawk River at North Genesee St. has been awarded by the Bd. of Contract and Supply to J. G. Dewhurst, at \$2,270. Mr. Dewhurst was the only bidder.

Cleveland, O.—The contract for the construction of eleven secondary piers for the new proposed high level bridge has been awarded to the Great Lakes Dredge & Dock Co., at their bid of \$497,000.

Bartlesville, Okla.—The Bd. Co. Comrs of Washington Co. has awarded 4 bridge contracts at a total cost of about \$20,000.

Portland, Ore.—The bridge committee of the executive board has recommended the awarding of the contract for the paving of the approaches to the Broadway Bridge to Gleblish & Joplin at \$13,589.89.

Philadelphia, Pa.—A contract for erecting a steel bridge on Glenwood Ave., west of 18th St., has been awarded to Geo. A. Fuller Co., at \$4,000.

Ft. Worth, Tex.—The contract for building the Main St. concrete viaduct has been awarded by the Co. Comrs. to Hannan Hickey Bros. Constr. Co. at \$373,948.65.

The contract for the construction of the Seventh St. Bridge, near city park, has been awarded to the Tarrant Constr. Co. at \$106,772.17.

Waco, Tex.—The county authorities of McLennan Co. have awarded 4 bridge contracts to Austin Bros., of Dallas, for \$4,443.

Burlington, Wis.—The contract for the construction of a new steel and concrete bridge across Hoosier Creek, on the Kenosha Road, has been awarded to P. J. Hurtgen at \$885.

BONDS.

Phoenix, Ariz.—Bonds have been voted to the amount of \$30,000 for improving the McDowell road.

Clearwater, Fla.—The question of issuing paving bonds will soon be submitted to a vote of the people. Address City Clerk.

Sterling, Ill.—A special election will be held to decide the question of issuing \$35,000 Twp. paving bonds. Address Twp. Clerk.

Marshalltown, Ia.—The City Council has adopted preliminary plans toward issuing \$25,000 worth of bonds, not to exceed five per cent., to pay for the city's share of paving done this year.

Dayton, Ky.—The Council is planning to issue \$6,000 paving bonds. Address, City Clerk.

Mt. Vernon, Ky.—\$100,000 has been voted for good road bonds in Rockcastle County.

Winona, Miss.—At a recent election it was decided by the voters to issue \$40,000 in road bonds.

Kansas City, Mo.—The City Council is planning to issue \$650,000 in bonds for bridges, viaducts and traffic ways. Address, City Eng.

Nevada, Mo.—Bonds to the amount of \$20,000 have been voted for the purpose of building rock roads in Center Twp., of which Nevada is a part. The road to be built is a part of the Kansas City-Joplin automobile road.

Lincoln, Neb.—Sealed bids will be received at the office of the City Clk. of Lincoln, until noon, Nov. 20, for the purchase of special assessment bonds which are issued to each of four districts for the purpose of paying \$18,500 for paving in district No. 190; \$11,100 for paving in district No. 216; \$7,200 for paving in district No. 218, and \$5,400 for paving in district No. 210, making a total of \$42,000 in denominations to be designated by the purchaser. Roscoe C. Ozman, is City Clk.

Las Cruces, N. M.—Dona Ana Co. will vote on the question of issuing good road bonds. Address Co. Aud.

Cincinnati, O.—Bids will be received Nov. 19 for the purchase of \$120,500 street improvement bonds. Interest, 4 per cent. The bonds will be payable in 20 years. Address, Ira D. Washburn, Aud.

Dayton, O.—An ordinance was passed

to issue and sell bonds in the amount of \$5,200 for the paving of Hawthorne St., from Fifth St. to Germantown Ave. An ordinance was passed to issue bonds in the sum of \$6,200 for the improvement of Dunbar Ave., from Fifth St. to Germantown St.

Lakewood, O.—Sealed proposals will be received until November 25, at the office of B. M. Cook, City Auditor, for the purchase of the following bond issues: \$12,750 for the improvement of Winton Ave., from Cordova Ave. to W. Madison Ave., by paving; \$16,000 for the improvement of Edward St., by paving; \$16,300 for the improvement of Bonnie View Ave., from Detroit St. to Clifton Blvd., by paving.

Zanesfield, O.—Sealed proposals will be received at the office of the Clerk, until Dec. 2, for the purchase of bonds in the sum of \$800, for the purpose of resurfacing, repairing or improving the existing streets. F. O. Hockett is Clerk.

Corsicana, Tex.—The proposition to issue \$20,000 worth of street paving bonds was approved by the voters.

El Paso, Tex.—The citizens have voted to issue \$50,000 street improvement bonds. Address, The Mayor.

Everett, Wash.—It is probable that Snohomish County voters will be called upon to vote upon the proposition of issuing highway bonds to the amount of \$1,500,000 at a special election to be held in the near future.

MISCELLANEOUS.

Cincinnati, O.—Sealed bids will be received Nov. 29 at the office of the Bd. of Co. Comrs. of Hamilton Co., for building culvert on the Foley Road, near Trenton Ave., in Delhi Twp. The work to be done according to the plans and specifications on file in the office of the Bd. of Co. Comrs. Address, Stanley Struble, Pres.

Sealed bids will be received at the office of the Bd. of Co. Comrs., Nov. 22, for lengthening culvert and macadamizing over the new fill on the Toph Road north of Harrison Pike. The work to be done according to the plans and specifications on file in the office of the Bd. of

Books on Road and Street Construction

American Highways. Shaler	\$1.50	History of Bridge Engineering. Tyrrell.....	4.00
Asphalts. T. Hugh Boorman	3.00	Hydraulic Cement. Spalding	2.00
Catalogue of Minerals. Prof. Chester.....	1.25	Inspection of the Materials and Workmanship Employed in Construction. Byrne	3.00
Cements, Mortars and Concretes. Falk.....	2.50	Law of Contracts. Wait	3.00
City Roads and Pavements. Judson.....	2.00	Materials of Construction. Johnson.....	6.00
American Civil Engineers' Pocket-book. Merri-		Modern Asphalt Pavement. Clifford Richardson.	3.00
man	5.00	Modern Methods of Street Cleaning. Soper.....	3.00
Civil Engineer's Pocket-book. Trautwine	5.00	Municipal Franchises. Wilcox, 2 vols., each.....	5.00
Concrete Bridges and Culverts. Tyrrell.....	3.00	Municipal Public Works. Whinery.....	1.50
Concrete Costs, by Taylor & Thompson.....	5.00	Roadmaking, The Art of. Frost.....	3.00
Concrete in Highway Construction. Atlas Portland		Roads and Pavements. Baker.....	5.00
Cement Co.	1.00	Road Preservation and Dust Prevention. Judson.	1.50
Concrete, Plain and Reinforced. Trautwine, Jr...	2.00	Rocks and Rock Minerals. Pirsson	2.50
Cost Data. Gillette	5.00	Rock Excavation, Methods and Costs. Gillette...	3.00
Design of Highway Bridges. Ketchum.....	4.00	Rocks and Soils. Stockbridge.....	2.50
Dust Preventives and Road Binders. Hubbard...	3.00	Solid Bitumens. Peckham	5.00
Economics of Contracting. Hauer	2.50	Specifications for Street Roadway Pavements.	
Economics of Road Construction. Gillette.....	1.00	Whinery	.50
Engineering Works in Towns and Small Cities.		Text-Book on Roads and Pavements. Spalding..	2.00
McCullough	3.00	Theory and Design of Reinforced Concrete Arches	
General Specifications for Concrete Bridges.		Reuterdaahl	2.00
Watson	1.00	Tables for Calculating the Cubic Contents of	
Highway Construction. Byrne	5.00	Excavations and Embankments. Hudson...	1.00
Highway Engineering. Blanchard and Drowne...	2.00	Width and Arrangement of Streets.....	2.00
Highway Engineering. Morrison	2.50		

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GOOD ROADS

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Number
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The Third American Good Roads Congress

Plans for the Third American Good Roads Congress under the auspices of the American Road Builders' Association, which will open at Music Hall, Cincinnati, Ohio, Tuesday, Dec. 3, are practically complete. Reports from the officers of the association and the several committees charged with the work of preparing the program, arranging for the allotment of exhibition space and the entertainment of visitors, etc., indicate that this congress will surpass in interest and actual value to the paving and road building industry any previous meeting ever held.

It is assured that the exhibition of road and street building machinery and materials will be larger than that at Rochester, N. Y., in November of last year, which was the largest which has yet been held. The amount of space already reserved is much greater than that at any of the three previous exhibitions held in connection with conventions of the American Road Builders' Association.

Interest in that section of the exposition which will be participated in by the United States Office of Public Roads, states, cities and engineering schools is increasing steadily and applications for space are being received daily. Among the states for which space for exhibits have already been reserved are New York, Massachusetts, Michigan, Minnesota, Wisconsin, New Jersey, Connecticut, Illinois, Kentucky, Tennessee, Virginia, South Carolina, Washington and the District of Columbia. The City of New York and Cincinnati will both make exhibits. Among the educational institutions which will be represented by exhibits are the Massachusetts Institute of Technology, the University of Ohio, the University of Cincinnati, Columbia University and the Rensselaer Polytechnic Institute.

The exhibit of the United States Office of Public Roads will consist of models of modern roads of different types, and historic models showing the evolution of road building from ancient times to the present. The exhibits of the states and cities will comprise maps, charts and photographs showing various methods of building roads and streets, models of the different kinds of work, testing machinery, samples of materials, etc. The exhibits of the engineering schools will consist of maps, drawings, diagrams, photographs, charts and outlines of the engineering courses, as carried on in the several institutions.

Efforts are being made for delegates and visitors from New York City and vicinity to go to the convention in special trains. This will be done if a sufficient number can arrange to go at the same time. Similar plans are being made in Boston for the New England delegates. In the event of their not being a sufficient number who can go together to warrant an entire train, special coaches will be run on regular trains to accommodate all those who want to go together. The New England delegation proposes to leave Boston at 2 p. m., Monday, Dec. 2. Information regarding transportation, rates, sleeping car accommodations may be obtained from A. W. Dean, care of the Massachusetts Highway Commission, 11 Ashburton Place, Boston. The special train which it is proposed to run from New York will leave Grand Central Station at 4 p. m., Monday, according to present plans. This train will reach Cincinnati

at 10:50 Tuesday morning, in time for the opening session of the convention. Information regarding rates, etc., on this train may be obtained from the Transportation Committee of the American Road Builders' Association at 150 Nassau Street, New York city.

The several railroad passenger associations have granted special round trip rates to those who attend the convention.

The tentative program which will be carried out practically as prepared, with a few minor changes and additions follows:

TUESDAY, DECEMBER 3.

8.30 to 11 A. M.

Registration of delegates at convention headquarters, Music Hall.

11 A. M.

Congress called to order by the President.

Address of welcome on behalf of the state of Ohio.

Address of welcome on behalf of the city of Cincinnati.

Address of welcome on behalf of Hamilton County.

Address of welcome on behalf of the Cincinnati Chamber of Commerce.

Response on behalf of the American Road Builders' Association.

Response on behalf of visiting state officials.

Response on behalf of visiting city officials.

Response on behalf of visitors from other countries.

Appointment of Committees.

2 30 P. M.

Opening address by the President of the American Road Builders' Association, Nelson P. Lewis.

The Organization of a Highway Department:

(a) For a State, by Major W. W. Crosby, Consulting engineer, Baltimore, Md.

(b) For a large city, by Wm. H. Connell, chief of the Bureau of Highways and Street Cleaning, Philadelphia, Pa.

(c) For county and township, by A. N. Johnson, State Highway Engineer of Illinois.

Discussion to be opened by James Macdonald, State Highway Commissioner of Connecticut.

The Development of a Plan for a State Road System, by James R. Marker, State Highway Commissioner of Ohio.

Discussion, to be opened by Col. E. A. Stevens, State Highway Commissioner of New Jersey.

WEDNESDAY, DECEMBER 4.

10 A. M.

Bituminous Pavements for City Use, by George W. Tillson, Consulting Engineer to the Borough of Brooklyn, New York City.

Discussion.

Wood Block Pavements Laid By Day's Labor, by Ellis R. Dutton, Assistant City Engineer of Minneapolis, Minn.

Discussion to be opened by H. W. Klausmann, City Engineer of Indianapolis, Ind.
Cuts in Newly Paved Streets, by H. M. Walte, City Engineer of Cincinnati, O.
Discussion.

2 P. M.

The Contractor's Point of View, by Hugh Murphy, contractor for public works, Omaha, Neb.

Discussion.

Plant Equipment, by F. E. Ellis, manager, Essex Trap Rock & Construction Co., Peabody, Mass.

Discussion.

8.30 P. M.

The visiting delegates will be the guests of the citizens of Cincinnati.

THURSDAY, DECEMBER 5.

10 A. M.

Some Features of Macadam Construction, by T. R. Agg, Road Engineer, Illinois State Highway Commission.

Discussion to be opened by R. A. Meeker, State Highway Engineer of New Jersey.

Earth and Gravel Roads, by Robert C. Terrell, Commissioner of Public Roads of Kentucky.

Discussion.

Highway Bridges and Culverts, by W. A. McLean, Engineer of highways, Province of Ontario, Canada.

Discussion to be opened by A. W. Dean, Chief Engineer, Massachusetts Highway Commission.

2 P. M.

The Economics of Highway Construction, by Clifford Richardson, consulting engineer, New York City.

Discussion, to be opened by C. Gordon Reel, State Superintendent of Highways of New York.

Traffic Census as a Preliminary to Road Improvement, by Col. Wm. D. Sohler, Chairman, Massachusetts Highway Commission.

Discussion to be opened by Prof. A. H. Blanchard, Columbia University, New York City.

The Laying of 104 Miles of Smooth Road Surface in One Borough in Five Months, by G. Howland Leavitt, Supt. of Highways, Borough of Queens, New York City.

FRIDAY, DECEMBER 6.

10 A. M.

Discussion of the convention will be devoted to topical discussions. The particular subjects to be discussed will be determined by vote of the delegates. Ballots containing a list of questions will be distributed at the first session and delegates will be requested to indicate their choice. The speakers selected to open the discussions will be allowed ten minutes and other speakers five minutes.

This promises to be one of the most interesting and profitable sessions of the convention.

2 P. M.

Unfinished business.

Report of the Committee on Resolutions.

Meetings of members of the American Road Builders' Association; selection of Nominating Committee.

LIST OF QUESTIONS FROM WHICH SUBJECTS FOR TOPICAL DISCUSSION ARE TO BE SELECTED.

1. Small blocks, natural or artificial, for country roads.
2. Convict labor on road work.
3. Correction of alignment and grade in existing highways.
4. Care of the roadside, including tree planting and removal of unsightly objects.
5. Division of expense of road improvement.
6. Unit price vs. lump sum contracts.

Proposed Road Work in Korea

According to a report from Consul-General Geo. H. Scidmore of Seoul, Korea, in the "Daily Consular and Trade Reports," the sum of \$4,930,000 is to be expended for road work in Chosen, Korea, during the next five years. About 500 miles of the more important roads included in the proposed improvements are expected to be completed by the end of March, 1913, at a total cost of \$1,743,000.

Road improvement in Chosen is carried out according to two different methods, it is stated. By one it is under the direct management of the general government and by the other it is done by the local authorities by means of subsidies from the national treasury. While the roads of this section were not altogether neglected under the former Korean government, repairs were made in patches and were merely time serving, and no attention was paid to bringing all of the highways into one system. Some time ago the general government undertook the work and planned to thoroughly repair the most important roads. Twenty-six of these, having a total length of 1,174 miles, were selected, and work was to have been commenced in 1911. The work was delayed, however, and only a part of that planned for 1911 and 1912 was done, though, as previously stated, improvements to the amount of \$1,743,000 will have been completed by the end of next March, providing the present plans are carried out. The roads included in this work have a length of about 500 miles, of which 220 are nearing completion, and preparations are being made to commence work on the remainder.

Proposed Road Improvements in North Hempstead, L. I.

At the election on November 5 it was decided by the voters of North Hempstead, L. I., to spend \$109,500 for road improvements in the town during the coming year. Five propositions bearing upon highway improvement were voted upon at the election, and all carried by a good majority.

One proposition was for the improvement of the Middle Neck Road from the North Hempstead Turnpike to All Saints' Church. This was fostered by the Taxpayers' League of Great Neck Station, and secured the largest majority of any of the five proposed improvements.

The other proposed improvements approved by the voters were the macadamizing of the Station Road and Tenth Street, Great Neck, from Hicks Lane to Grace Avenue, at a cost of \$20,000, and the macadamizing, curbing and guttering of several streets in Port Washington, the total cost of which will be about \$30,000. Susquehanna Avenue, at Great Neck Station, from Middle Neck Road to the North Hempstead Turnpike, will also be improved by macadamizing at an estimated cost of \$7,500. It was further voted to spend \$12,000 in macadamizing and grading Bayview Avenue, from Plandome Road to Shore Road, and Manhasset Avenue and Highland Terrace, from Plandome Road to Bayview Avenue, Manhasset.

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State Aid Road Work in Wisconsin

The reports of the towns in the state of Wisconsin which have voted for state aid in the construction of roads and highway bridges during the coming year, have been prepared by the county officials throughout the state and submitted to the State Highway Commission.

The summing up of these reports discloses the fact that of the 1,195 towns in the state, 865 voted to ask for state aid in road construction. The total number of different pieces of road for which state aid was asked is 1,267, involving expenditures aggregating \$757,273. Requests for state money for the construction of bridges was voted in 205 towns, involving the construction of 337 bridges and calling for \$53,877 from the state.

Some of the towns, of course, voted to ask for state aid in both bridge and road construction. In all, 883 different towns in 68 counties made requests for state aid, involving a total amount of \$811,150. These figures are greatly in excess of those of last year which showed the vote for state aid road work in 1912. Last year 511 towns voted to ask for state aid in road construction, and 125 towns voted for state aid in building bridges. In all, 532 different towns in 65 counties voted for state aid for 1912, asking \$452,800 from the state.

The total amount of the highway fund available for work in 1913 is \$378,000. This includes one-quarter of the net proceeds from the automobile license fee of \$5 per car, which amounts to about \$28,000. The total sum available is \$433,150 less than the full amount of state aid for which requests have been made. In spite of this fact, some of the counties will get all the state aid requested, the sums asked by the towns being small.

About 60 counties will get less than they asked for, some of them getting less than one-fifth of the amount requested.

A bulletin issued by the Wisconsin Highway Commission states that it is hoped that some method will be devised whereby the state will give each town the full amount asked for. The Wisconsin highway law provides that in order to secure state aid in the construction of highways, the towns and counties must vote the appropriation of an amount equal to twice that which they expect to receive from the state, that is the state pays 33 1-3 per cent. of the cost. For building bridges, the state pays 20 per cent. This law has

been complied with in each case involved in the foregoing figures.

The interest in highway improvement in Wisconsin has increased so rapidly that the making of adequate laws to provide funds as fast as they are requested has not kept pace with the demand. It is estimated that the full amount which would be paid out for road improvement during 1913 if it were possible for the state to pay its full share, would be considerably over \$2,500,000.

The bulletin issued by the State Highway Commission further remarks that there has not been in the United States a movement for better roads so state-wide or so generally popular, as that in Wisconsin, and that the results so far secured with the state aid road laws promise well for the future development of the roads of the state. A table issued by the Commission shows the percentage of state tax paid during the year 1912, the amount due from the state highway fund, and the amounts petitioned for by the various towns in each county.

According to this table towns in Milwaukee County petitioned for \$77,725, while the amount due Milwaukee County from the state highway fund is \$74,371. Eight of the eleven towns of Ashland County asked for \$31,150, whereas, the amount due the entire county is \$2,293, making the excess amount petitioned for \$28,857. In Dane County 32 of the 35 towns petitioned for \$45,231, an excess of \$27,432 over the amount to which the entire 35 townships are entitled. In Green County each of the 16 towns of the county voted appropriations for road work and petitioned for state aid money, the total amount asked for being \$23,715, an excess of \$17,776, their total allowance from the state highway fund being \$5,939. In Monroe County 17 of the 24 towns asked for an aggregate sum of \$21,673. The amount due the entire 24 towns is \$3,819, making an excess of \$17,854. In Rock County state aid was petitioned for by 19 of the 20 towns; the total amount requested was \$20,325, which is \$9,409 more than the towns of the county are entitled to. Of the 22 towns of Sauk County which are entitled to state aid to the amount of \$5,916, 19 asked for \$36,416. Each one of the nine towns of Vilas County voted for state aid, the total amount asked for being \$20,000. They are entitled to \$1,195.

On the other hand, the towns of nine counties voted to ask for state aid in amounts less than that to which they are entitled. In Burnett County, which is entitled to \$822, only 2 of the 18 towns voted for state aid, the total amount asked for being \$800. In Calumet County, four of the nine towns voted for state aid to the amount of \$2,150, while all the towns of the county are entitled to \$3,431. Each of the ten towns of Green Lake County voted for state aid, the aggregate amount being \$3,000, or \$4 less than the amount to which they are entitled. None of the seven towns of Ozaukee County voted for state aid, although, they are entitled to \$3,075. This was also the case in the eight towns of Sawyer County which are entitled to \$1,281, and in the 17 towns of Washburn County to which are due \$931.

The largest amount to which the towns of any county are entitled over the amount asked for is \$4,409 in Winnebago County. Its 15 towns are entitled to \$9,609, and only 10 voted for state aid, asking for \$5,200.

The total amount not called for, that is the total amounts of the sums asked in the various counties under that to which they were entitled is \$11,276.

Mesa Verde, National Park, one of Colorado's most interesting and picturesque scenic areas, is rapidly becoming more accessible to tourists by the extension of the good roads system in that state. Only a little more than 6 miles of additional road is required to be built in order that the prehistoric cliff dwellings which are included among the attractions of the park may be reached by carriages.

Coming Meetings

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec. 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Personal Notes

E. T. Proctor has been elected County Surveyor of Jackson County, Mo., with headquarters in Kansas City.

J. Vinton Dart, formerly connected with the City Engineer's Department, has been appointed Engineer in Charge of the Highway Department of Providence, R. I.

John M. Baird has resigned his position as Bridge Engineer for Kings County, Wash., in order to engage in private practice as consulting bridge engineer.

Norwood Ross Charman, a graduate of the University of Oregon, class of 1910, has been appointed a member of the State Highway Commission of California.

General Notes

In Orange County, Tex., work has recently been begun on a 58-mile contract for road building held by Ray McDonald, of Austin.

The city of Allegan, Mich., will have more than a mile of brick pavement when the work now in progress is completed. The city has 4,000 inhabitants.

The State Highway Department of Ohio will let contracts for from 25 to 30 miles of road between now and January 1. The chief materials are water bound macadam, bituminous macadam, concrete and brick.

The first concrete highway in North Carolina, leading from Raleigh to the Country Club, has recently been completed. It was built entirely by convict labor at a cost of approximately \$10,000 per mile.

Contemplated improvements in Chicago have received a setback by the Supreme Court's construction of the Juul law. This tends to make practically inoperative the popular vote in favor of an \$11,250,000 bond issue for the construction of bridges, street improvements, etc.

A meeting is to be held at Mineola, L. I., on Nov. 28, at which the town good roads committee and the Board of Supervisors will discuss the repair work to be done next spring to county roads.

The National Highways Protective Society has elected the following officers: Frederic R. Coudert, President; Bradley Martin, Jr., Vice-President; Edward S. Cornell, Secretary, and Frederick M. Davis, Treasurer.

The Ocean-to-Ocean Highway Association, at its annual convention closing at Santa Fe, N. M., Nov. 12, elected officers as follows: George W. Wilder, Redlands, Cal., president; Mont T. Chubb, Redlands, Secretary-Treasurer.

Work has been begun in Santa Monica, Cal., on street improvements calling for an expenditure of \$338,000. Oregon Ave. is to be paved with asphalt on a concrete base for a distance of about two miles.

Work has been begun on the construction of a public highway leading from Sherman, Tex., for which bonds to the amount of \$400,000 were recently voted. The city will also soon start work on street paving, on which \$300,000 will be expended.

The City Council of Seattle, Wash., has ordered the paving of Fremont Ave., north to 50th St., and it is contemplated to continue this work to the city limits, eventually establishing thoroughfares to the Country Club and to the north trunk road, both routes leading to Everett.

The uncertainty regarding the location of the streets to be used for the subway in Chicago, Ill., is holding up several important paving projects which affect altogether 16 blocks in the "Loop" district of the city. The paving has been authorized and all the necessary legal steps have been taken, but no work will be commenced until the subway plan is settled.

It is stated that when the work on the trail from Edmonton north to Athabasca, Alta., a distance of 100 miles, is finished this fall, it will be possible for an automobile to travel between the two points in four and a half hours. The work is being carried on under the direction of John Stocks, Deputy Minister of Public Works for Alberta. The work on highways in this section of the country is rendered more than ordinarily difficult by the wild nature of the country and the growth of timber.

In Cuba a public road is divided into sections, each under the direct supervision of an overseer appointed by the President. These overseers are held responsible for the proper maintenance of the roadbed, and the result is said to be very satisfactory.

A proposition to amend the charter of St. Paul, Minn., so as to remove the existing \$200,000 limitation from the street and sewer funds for the purpose of extending street and sewer operations was endorsed by the voters at the recent election. Three-fifths of all votes cast were necessary to carry the amendment.

T. J. Dickerson has been made contracting engineer for the Strauss Bascule Bridge Co. of Chicago, with headquarters in that city. He was formerly eastern representative of the company. He has succeeded in the eastern territory by J. I. Vincent, for several years eastern representative of the Scherzer Rolling Lift Bridge Co.

Proposed street improvements in Joliet, Ill., calling for an expenditure of \$73,000, have been delayed by the ruling of Judge Cowing, who dismissed two petitions for special assessments, on the grounds that, in one case, the engineering estimate was incorrect, and, in the other, the improvement was uncalled for.

The state of Sao Paulo, Brazil, is negotiating with the Federal Union for the purchase of the building in which the State Treasury is now working. The apparent purpose is to pull down this building to make way for new streets from the cities of Ypiranga, Moca, and Braz. The cost of the building is \$330,000.

The City Engineer of Niagara Falls, N. Y., has formally opened a stretch of asphalt block pavement between Buffalo Ave. and Portage Road. The pavement has an area of 30,000 sq. yds. and was built at a cost of \$90,000. The work was started June 18. The road is the old Portage Road, one of the historical highways along the Niagara frontier.

The Supreme Court of Tennessee has decided that the third and latest bond issue of Sullivan County for building pike roads, amounting to \$200,000, is valid. This decision was made in a suit which had been filed assuming that the bonds, for certain reasons, were not valid. Bonds issued within the last few years for good roads amount to \$500,000.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

Date of letting	Reported in issue of
11-25 Los Angeles, Cal., asphalt pav.	11-16
11-25 Houston, Tex., bitulithic paving	11-16
11-26 Ashland, Ala., road constr.	11-16
11-27 Cincinnati, O., st. work	11-23
11-27 Cincinnati, O., brick paving	11-23
11-27 Cincinnati, O., concrete paving	11-23
11-29 Cincinnati, O., county rd. work	11-16
11-30 Oxford, Miss., county rd. work	11-16
12- 3 Pikeville, Ky., st. paving	11- 9
12- 3 Ocala, Fla., paving	11-16
12- 3 Columbus, O., brick paving	11-16
12- 3 Jacksonville, Fla., brick paving	11-23
12- 9 Rome, Ga., st. paving	11-23
12-18 Fernandina, Fla., vit. brick pav.	11- 9

BRIDGES.

11-25 New Brunswick, N. J., concr. & steel bridge	11-23
11-25 Little Rock, Ark., viaduct	11-16
11-25 Akron, O., bridge superstruc.	11- 9
11-26 Washington, D. C., steel bridge	11-23
11-26 Augusta, Me., steel bridge	11-23
11-30 Oxford, Miss., concr. and steel bridges	11-23
12- 1 Terre Haute, Ind., two concrete bridges	11-16
12- 2 Chatom, Ala., two steel bridges	11-23
12- 2 Santa Barbara, Cal., two bridges	11-23
12- 2 Albany, N. Y., bridge	11-23

MISCELLANEOUS.

11-25 Lakewood, O., bonds	11-16
11-29 Cincinnati, O., culvert	11-16
12- 2 Zanesville, O., bonds	11-16
12- 7 Pearsall, Tex., road bonds	10-19
12-17 Cleveland Heights, O., bonds	11-23

ROADS AND STREETS.

Bids Asked and Prospective Work.

Bay Minette, Ala.—The Commissioners of Baldwin county have decided to devote \$6,000 from the treasury for help in building good roads, the money to be awarded pro rata to the towns or sections raising additional funds.

Montgomery, Ala.—Sealed proposals will be received until Nov. 26, for the paving with Schillinger paving or hexagon tile of the sidewalks on the north side of Pine St. from the west side of Mulberry St. to the east side of Forrest Ave., together with all necessary curbs, gutters, and storm sewers in connection therewith. Address Robert Tait, City Treas.

Phoenix, Ariz.—The city council has ordered the construction of a 35-foot asphalt pavement on Roosevelt Ave. for a length of twelve blocks, and cement sidewalks on both sides of the street. Bids will be taken in about two weeks.

Bakersfield, Cal.—The Board of Trustees has ordered the construction of asphalt pavements on Chester Ave., from the new bridge to the city limits.

Lordsburg, Cal.—Frank H. Lathrop, Higgins Bldg., Los Angeles, has been appointed engineer for the new road system, and will at once begin the plans and specifications. Bids will be received about Dec. 15 for the first portion to consist of 2.3 miles of roadway, with concrete base and asphalt wearing surface. Est. cost, \$36,000.

Los Angeles, Cal.—R. D. Lisk, 1021 Central Bldg., is taking bids for paving with concrete and asphalt, 6 miles of streets in Chesterfield Square. L. Friel, Stimson Bldg., is the engineer.

Pasadena, Cal.—Street work to cost one-third of a million dollars is being planned in the office of City Engineer Van Norman, and bids for the work will be called for in about one month. The work consists of improving 8.5 miles of streets with asphalt and concrete paving. The streets to be improved are: Walnut, from Raymond to Lake, a distance of one mile; Lake, from Calif. to the south city limits, a distance of 1.75 miles; Oak Knoll Ave., from Cal. St. to the south city limits, a distance of 1.75 miles; Hillcrest Ave., entire length, one mile; Lincoln Ave., from Fair Oaks to Forrest, a distance of 2 miles; Raymond Ave., from Green to Glenarm Sts., one mile.

San Francisco, Cal.—The Board of Works has requested the Supervisors to set aside \$8,000 for an asphalt pavement on Fifth St., between Market and Mission,

and \$5,940 for an asphalt pavement on 11th St., between Market and Mission. It has directed the City Engineer to estimate the cost of widening Army St., from Mission to Kentucky, to 100 feet, the width now being 80 feet, and to make an estimate of the cost of and prepare plans for improving San Bruno Ave., from 25th St. to the county line.

Santa Ana, Cal.—The election for voting \$1,270,000 bonds for the construction of 107 miles of roads throughout the county was carried. Bids will be received about Dec. 15 for the construction of a macadam paving on the first section. D. S. Holliday, Central Bldg., Los Angeles, has been appointed chief engineer for the work.

Venice, Cal.—Plans are in preparation for the construction of a bulkhead and 20-ft. cement walk, ornamented with lighting-posts, on the ocean front, between Center St. and Del Rey.

Jacksonville, Fla.—Bids will be received until Dec. 3 for the construction of 4,536 sq. yds. of vitrified brick paving. Address H. C. Sistrunk, City Clerk.

Lagrange, Ga.—Plans for widening Greenville St. and grading Vernon St. are under consideration.

Rome, Ga.—Proposals will be received until Dec. 9, for grading, curbing and paving certain streets with either wood block, vitrified brick, Hassam compressed concrete, asphaltic concrete, sheet asphalt, or bitulithic material. The work will embrace approximately furnishing and setting 8,900 lin. ft. of granite curb, or concrete curb and gutter, foundations and surfacing 19,000 square yds. of pavement. Specifications may be obtained from and plans and profiles seen at the office of the City Engineer, Rome, Ga., and general information from B. C. Yancey, Mayor.

East St. Louis, Ill.—A new sewer district and an extensive street improvement are provided for in an ordinance adopted by the Board of Local Improvements of East St. Louis. Vitrified brick will be used.

Peoria, Ill.—Extensive plans are in the hands of the city council for paving work next spring. Among the jobs with contracts already let for next spring, or which are in the hands of the city council or board of improvements are: South Adams St., State St., Monson St., North St., Globe St., Fayette and Fulton Sts., in the business section; Cooper and Callendar Sts., Frye Ave., Maryland St., Hurlburt St., and Brotherson St.

Rock Island, Ill.—Extensive plans for street improvement next spring have been considered at an Improvement Board meeting. It is desired to repave all cross streets in the business section as well as several blocks in the residence section. One plan discussed covers proposed improvement of 11th St., from 9th Ave. to the river.

Waukegan, Ill.—A resolution has been introduced before the Board of Local Improvements for the paving of Grand Ave., from West St. east to Buttrick St., and also for the installation of a sewer system on Buttrick St., which will care for that district.

Vigo, Ind.—A petition for the construction of a gravel or macadamized road within Vigo township has been filed with the Board of Commissioners of Knox County.

Clinton, In.—Plans have been filed for the paving of 5th Ave., from 5th St. to Bluff Blvd., with "Dolarway" paving.

Des Moines, Ia.—Resolutions have been passed to make improvements by paving with No. 1 vitrified paving brick upon six inches of Portland cement concrete foundation, the following streets and parts of streets: 4th St., from the paving now in place on Elm St. to the pavement in place on Vine St.; Vine St., from the pavement in place at West 4th St. to the pavement in place at West 5th St.; the east and west alley in block 19, Fort Des Moines, from the west line of West 4th St. to the east line of West 5th St.; the north and south alley in block 19, Fort Des Moines, from the south line of Vine St. to the north line of the east and west alley in block 19.

Wichita, Kan.—The Board of Commissioners have adopted resolutions for paving Briggs Ave., between Porter Ave. and River Blvd., with concrete; and Circle Drive, from English to Waterman Sts., with asphalt. Specifications are on file in City Engineer's office.

Cadiz, Ky.—A petition signed by the required number of voters has been filed in the Trigg County Court, asking that an election be called for Saturday, Jan. 25, 1913, to take the sense of the voters of this county upon an issue of \$150,000 in bonds for pike purposes.

Baltimore, Md.—The Paving Commission has selected the following streets for improvement in the early part of next year, the contracts to be awarded this year: Fort Ave., from Lawrence St. to Fort McHenry; Bloom St., from Pennsylvania Ave. to Eutaw Pl.; Fayette St., from Pine to Paca Sts.; Saratoga St., from Calvert to Gay Sts.; Frederick St., from Gay to Lexington Sts.; Greene St., from Lexington to Baltimore Sts.; Granby St., from Exeter St. to Central Ave.; Low St., from East to Front Sts.; West St., from Light St. to Riverside Ave.; Watson St., from High St. to Central Ave.; Lombard St., from South to Gay Sts.; Commerce St., from Lombard to Pratt Sts.; Exeter St., from Fayette to Baltimore Sts.; Customhouse Ave., from Water to Lombard Sts.; Maryland Ave., from Chase to Preston Sts., and from the Pennsylvania R. R. bridge to North Ave.; Calvert St., from Saratoga to Pleasant; Division St., from Lafayette Ave. to Mosher; Hargrove Alley, from Saratoga to Pleasant; Elliott, from Pratt to Lombard; Hollingsworth, from Pratt to Lombard; Grant, from Pratt to Water; Fort Ave., from Light to Hanover; Forrest, from Lexington to Fayette; Pleasant, from Calvert to Guilford Aves. The commission also decided to park Lanvale St., from Park to Mount Royal Aves., and John St., from Dolphin to Lafayette Aves.

Meridian, Miss.—The following resolutions have been passed by the City Council: Authorizing the paving of Marion Ave., between Heasley St. and South Ave.; authorizing the paving of Pine St., between Woodland and Fairmont Aves.; authorizing the levying of a special assessment for the improvement of Murdock St. between Himrod Ave. and Shehy St.

Wesson, Miss.—A majority of the taxpayers have petitioned the Board of Supervisors of Copiah County for the building of a model highway from Wesson to Rockport, a distance of nineteen miles.

St. Louis, Mo.—A report of Engineer Harper on the paving of Trendley Ave., 14th St., 21st St. and Market Ave., at an estimated cost of \$103,353, has been accepted.

Fremont, Neb.—Specifications for the paving of C St. have been approved by the board. They specify vitrified paving brick laid on a 4-inch concrete foundation. The paving will be 38 ft. wide with a combination curb and gutter at each side. A maximum cost of \$1.98 a yard for the paving and 57 cts. a lin. ft. for the combination curb and gutter was also specified. Address City Clerk.

Trenton, N. J.—A resolution has been passed by the Board of Freeholders approving the plans and specifications of the Hopewell-Mount Rose Rd., which it is estimated will cost \$45,000. A resolution was also adopted directing the survey of the Yardville-Newton-Windsor Rd.

Binghamton, N. Y.—The completion of the paving of Leroy St. ends the city paving work for the season. Early next year the contract for paving Eldredge St., from Prospect Ave. to Chenango St., will be let and it is expected a brick pavement will be laid on Conklin Ave., from the Exchange St. bridge to DeRussey St. Henry and Carroll Sts. will be repaved, but whether with brick or bitulithic will be decided later.

Newark, N. Y.—At a recent meeting of prominent citizens, a resolution was passed to the effect that the taxpayers of Sodus and Arcadia request the Board of Supervisors of Wayne County to authorize the construction of a county highway beginning at the south line of the town of Arcadia so as to connect with the county road in the town of Manchester and Phelps on the south, and to run north through Newark and Fairville to the north end of Carlton St. in the village of Sodus. The committee in charge will urge the presentation of this petition to the Board of Supervisors and its favorable action on the same within the year will also be urged.

Syracuse, N. Y.—Ordinances starting proceedings to order nearly a mile and a half of pavement from Gifford to Chemung Sts. along the line of the Rapid Transit Company's Solvay line have been

adopted by the Common Council. The ordinances are under the provision of the charter which authorizes the council to order five miles of new pavement each year without petitions by property owners. The limit has been reached this year, but by acting now it is understood that these improvements will take precedence over those ordered later next year. The city will contribute \$11,199.23 towards the cost of the pavement about Washington Park in the First Ward and \$895 toward the cost of the South Beech St. pavement.

Akron, O.—An ordinance was passed to levy special assessments for the improvement of Grand Ave., from Portage Path to Exchange St., by grading, curbing and paving.

Canton, O.—An ordinance has been passed to proceed with the improvement of South McKinley Ave., from Cedar St. to South End, by grading, setting curbs, laying flagstone sidewalks and paving the roadway with vitrified paving blocks. Address J. F. Buchman, President of the Council.

Cincinnati, O.—Sealed proposals will be received at the office of the Director of Public Service, City Hall, until Nov. 27, for the improvement of Harris Ave., from St. Lawrence to 8th Aves (formerly 8th St.), by grading, setting cement combined curb and gutter, macadamizing the roadway with tar binder, and finishing course and constructing the necessary drains, inlets and retaining walls. Plans, specifications and blank proposals can be obtained at the office of the Chief Engineer, Department of Public Service.

Sealed proposals will be received at the office of the Director of Public Service, City Hall, until Nov. 27, for the improvement of Wingate Alley, from Cutter to Jane Sts., by paving with brick. Plans, specifications and blank proposals can be obtained at the office of the Chief Engineer, Department of Public Service.

Sealed proposals will be received at the office of the Director of Public Service, City Hall, until Nov. 27, for the improvement of Snabley Alley, from 88 ft. east of Church St. to 88 ft. west of Church St., by paving the roadway with concrete. Plans, specifications and blank proposals can be obtained at the office of the Chief Engineer, Department of Public Service.

Columbus, O.—An ordinance has been passed to provide for the issue of bonds in anticipation of the collection of special assessments for the improvement of Southwood Ave., from Parsons Ave. to the east corporation line. Address John T. Barr, Clerk.

Dayton, O.—An ordinance has been passed declaring it necessary to improve Grand Ave., from Salem Ave. to Broadway, by paving.

An ordinance has been passed determining to proceed with the improvement of Creighton Ave., from Wyoming to Gatch Sts.

A resolution has been passed declaring it necessary to improve Whitmore Ave., from National to Kinnard Aves.

An ordinance has been passed declaring it necessary to improve Brightwood Ave., from alley south of Plant St. to Lot No. 2,201. Address Wayne G. Lee, Clerk of Council.

Lorain, O.—A petition signed by property owners on East 29th St. has been presented to the City Council, requesting that the street be paved from Pearl to Clinton Aves.

An ordinance to proceed with the paving of East 30th St., from Vine to Pearl Aves., has been passed by the Council.

An ordinance to proceed with the paving of Oberlin Ave., from First to West 2d Sts., has been introduced in the Council.

Newark, O.—An ordinance was passed determining to proceed with the improvement of Elmwood Ave., from Log Pond Run to Shields St., by paving and curbing the roadway.

Portsmouth, O.—The issue to allow an additional two-mill levy on the tax duplicate for the maintenance of roads and bridges was carried in Scioto County. This levy will enable the county to make needed improvements.

Toledo, O.—An ordinance has been passed determining to proceed with the improvement of Seneca St., from Cherry to Lagrange St., by grading and paving.

An ordinance has been passed to assess a special tax on real estate bounding and abutting on Heston St., from Dorr St. to Avondale Ave., for the improvement of Heston St., between said points, by grading, paving, etc.

An ordinance has been passed to assess a special tax on real estate bounding and abutting on Central Ave., from Lagrange to Hartman Sts., for the improvement of

Central Ave., between said points, by grading, paving, etc.

Youngstown, O.—An ordinance has been passed to levy special assessments for the improvement of Short St., between Broadway and Emerson Place, by paving the same.

Resolutions have been passed as follows: To grade Ashland Ave., between Oak and Emma Sts.; to pave Oak Hill Ave., between north line of City Lot No. 14564 and Princeton Ave.; to pave Earle Ave., from Hillman to Edwards Sts., or to the west line of City Lot No. 15,520; to pave Powers Way, from Poland Ave. to end of existing pavement, and to pave Maple Ave., between Wick and Andrews Aves. Address S. S. Davis, President of Council.

Monongahela, Pa.—The grand jury has expressed its approval of the proposed brick road leading from Donora toward Monongahela, for a distance of about 3 miles. It is also stated that the proceeds from a \$100,000 bond issue authorized for next year will be used for the repair of roads.

Philadelphia, Pa.—Of the \$7,000,000 municipal loan bill recently carried, about \$2,000,000 will be used for street improvements.

Uniontown, Pa.—Fayette County, according to a decision reached by the county commissioners, will spend about \$120,000 on new brick roads in 1913. The approval of the grand jury and court is expected.

Greenville, Tex.—The council is planning to pave 6 additional miles of streets. Estimated cost, \$75,000. Address City Engineer Donaldson.

Seattle, Wash.—Councilman Max Wardall's resolution to pave Westlake Blvd., between Mercer and Galer Sts., a distance of 300 ft., with a top of asphalt over the present planing, in order to test the durability of such paving, was sent to the streets and sewers committee. Resolutions adopted to order street work were as follows: Concrete walks for 34th Ave. northwest, from West 62d to West 68th and other streets; grading and curbing for 24th Ave., south from Andover to Horton Sts.; Spokane St., from 24th Ave. south to Beacon Ave., and Beacon Ave., from Spokane to Hinds Sts.; paving and concrete walks for 12th Ave., south from Judkins St. to Holgate St., and Judkins, Atlantic, Massachusetts and Holgate Sts. each from 12th Ave. south to 13th Ave. south.

A bill providing for the laying off, widening and establishing of Queen Anne Blvd. and 5th Ave. west between West Halladay and West Ray Sts., providing for the condemnation of property necessary, and providing that the entire cost of the improvement be paid by special assessment, was sent to the streets and sewers committee.

The paving of Fremont Ave., from Ewing to North 50th St., with asphalt over a concrete base, providing for the construction and reconstruction of concrete walks, water mains and sewers, was ordered by ordinance, and also the construction of sewers in 5th Ave. west and connecting streets.

Edmonton, Alberta.—It is reported that half a million yards of street paving are to be laid in Edmonton next year and tenders for the work will be opened about the middle of December. There will be four weeks within which paving companies will be here looking over the ground and figuring upon the work.

Bids Received and Contracts Awarded.

Birmingham, Ala.—The contract for the construction of the stretch of highway known as the State Aid Road, was awarded to the firm of Goodrich & Crenkley, of Tennessee.

Corona, Cal.—The contract for the improvement of Grand Blvd. was awarded to O. F. Easley, of Alhambra, whose bid was \$65,297.04. Other bids were: J. M. Montgomery, \$66,832.56; Hudson-Johnson Const. Co., \$74,464.14; Johnson Shea Co., \$74,629.01; Highway Const. Co., \$74,756.83; L. G. Garnsey, \$75,435.74; Geo. H. Oswald, \$76,801.10; J. O. Stanford, \$82,725.95; T. E. Shafer, \$83,735.92; W. J. Brand, \$84,776.07.

Fresno, Cal.—The City Council has accepted bids as follows: Thompson Bros., \$13,971 for improving Stanislaus Ave., and California Road and Street Improvement Co., \$14,632 for repaving Blackstone Ave.

Inglewood, Cal.—The City Council received bids for the improving of Fir St. as follows: Pearson & Anderson, \$13,408.86; Frank Giespie, \$13,552.58; John D. Marsh, \$14,287.62; Geo. H. Oswald, \$14,-

326.32; Geo. A. Rogers, \$14,832.99; P. A. Thomas, \$15,671.98; M. S. Cummings, \$16,480.63.

Los Angeles, Cal.—W. N. Hendricks was the low bidder for constructing a storm sewer in bed of the Los Angeles River and improving certain streets, at 11 cts. for repaving, 52 cts. for gutters and \$16,500 for storm sewers complete. The other bids were: J. Balch, 13 cts. for paving, 43 cts. for gutters, \$17,442 for storm sewers; J. Mohan, 13 1/2 cts. for paving, 45 cts. for gutters, and \$18,900 for storm sewers.

The Conner Contracting Company submitted the lowest bid at about \$12,411.80 for improving a portion of the Compton-Clearwater Road. The bids received by the Board of Supervisors were: Conner Contracting Co., (a) 4,300 cu. yds. of excavating at 25 cts.; (b) 14,480 lin. ft. of shaping road bed at 10 cts.; (c) 10,200 tons of macadam at 90 cts.; (d) 32.8 cu. yds. of class A concrete at \$12; (e) 1,430 lbs. of steel at 4 cts.; (f) 32 ft. of concrete pipe at \$150; (g) 300 ft. of fence at 50 cts. Hudson-Johnson Construction Co., (a) 40 cts.; (b) 7 cts.; (c) \$1.25; (d) \$15; (e) 5 cts.; (f) \$1.25; (g) 50 cts.; total, \$16,227.10. L. G. Garnsey, (a) 20 cts.; (b) 10 cts.; (c) \$1.10; (d) \$10; (e) 4 cts.; (f) \$1; (g) 50 cts.; total, \$14,095.20. John D. Marsh (a) 40 cts.; (b) 9 cts.; (c) 94 1/2 cts.; (d) \$13; (e) 4 cts.; (f) \$1.90; (g) 48 cts.; total, \$14,276.10. Rogers Bros. (a) 40 cts.; (b) 9 cts.; (c) \$1.10; (d) \$12; (e) 5 cts.; (f) \$2; (g) 50 cts.; total, \$14,922.30. Geo. S. Benson & Sons (a) 25 cts.; (b) 10 cts.; (c) \$1.05; (d) \$12; (e) 5 cts.; (f) \$2; (g) 50 cts.; total, \$13,912.10. The bids were referred to the highway commission.

Geo. R. Curtis was awarded the contract for improving Commonwealth Ave., from Temple St. to Melrose Ave. His bid was \$13,736.78.

The contract for the improvement of Alameda St., between 7th and 21st Sts., has been awarded by the Board of Public Works to the Barber Asphalt Paving Co. Its bid was \$71,635.63.

Redondo, Cal.—The Barber Asphalt Paving Co. was awarded the contract for the improvement of Catalina Ave., its bid being \$58,507.01.

Sacramento, Cal.—The State Highway Commission has awarded to the Natoma Consolidated Co. a contract calling for 500,000 tons of crushed rock for use on state highways.

The following bids were received by the Highway Commission for the improvement of 6.5 miles of state highway north of Cahuenga Pass: Rogers Bros. Co., \$33,047.70; Hudson Johnson Co., \$33,785.67; Metropolitan Construction Co., \$34,547.16; J. M. Montgomery, \$35,813.90; Engineering and Construction Co., \$36,723.45; F. Conner Const. Co., \$38,244.45; Leigh Garnsey, \$42,569.97; F. Prendergast, \$50,695.45.

San Francisco, Cal.—Private contracts for street work at the following locations have been approved by the Board of Public Works: Sewers in 44th Ave., between Irving and Judson Sts.; Broad St., from Plymouth Ave. to a point 220 ft. easterly; San Jose Ave., southerly from Whipple Ave. to a line at right angles to the southeasterly line of Farragut Ave.; curbs and pavement at intersection of Gladys and Santa Maria Sts.; in 26th Ave., between Anza and Balboa Sts.; in Lombard St., between Kearny St. and Grant Ave.; in Mississippi St., between 18th and Mariposa Sts.

The Board of Works has recommended an appropriation of \$23,000 for the improvement and paving of California Ave.

Torrance, Cal.—The Dominguez Land Co., owners of the new townsite of Torrance, has awarded contracts for street work as follows: Arthur S. Bent & Geo. Pennebaker, Central Bldg., Los Angeles, for constructing asphalt and oil-macadam paving in Torrance, at 9 1/2 cts. per sq. ft. for 255,000 sq. ft. of asphalt paving, and 7.2 cts. per sq. ft. for 235,000 sq. ft. of oil macadam. The aggregate amount is \$40,000. The same firm received a contract in the amount of \$9,000 for the construction of sewers. Robert Shearer, Pacific Electric Bldg., Los Angeles, was awarded a contract for the excavation of 70,000 cu. yds. of earth at 24 cts. per cu. yd. A contract for improving certain streets in Torrance was awarded to Bent & Pennebaker, who were the lowest bidders in the amount of \$15,270.

Bethel, Conn.—Goodman & Trumbull Litchfield, have been awarded contract for 6,024 ft. of macadam construction on Center St., Greenwood and Diamond Aves., and Grassy Plain St. Their price was \$2.18 per ft. for macadam and \$3.08 for macadam-telford construction.

Ridgefield, Conn.—A contract for 5,904 ft. of road improvement on South Salem

Rd., from West Lane to the New York line, has been awarded to F. J. Kellogg at \$2.20 per ft. for gravel and \$2.60 per ft. for telford.

Elkhart, Ind.—The contract with the Northern Construction Co. for paving Oakland Ave. with brick was abrogated by court order and a new contract designating sheet asphalt as paving material was awarded to the Andrews Company, whose bid was \$35,459.92.

Richmond, Ind.—Contract has been awarded to the Foster Construction Co. of Richmond, for building the Richmond and Newport turnpike. The bid was \$28,790.

Baltimore, Md.—Bids were opened by the Board of Awards for the contract for paving the following streets in the Annex with bituminous concrete for the Commissioners for Opening Streets: Second St., from 26th to 27th Sts.; Chester St., from Huntingdon to Hampden Aves.; 27th St., from Calvert St. to Guilford Ave.; 26th St., from Calvert St. to Guilford Ave.; Hampden Ave., from 27th to 29th Sts.; Oak St., from 26th to 27th Sts.; Chester St., from North Ave. to Clifton Park; Malakoff St., from Chester to Washington Sts. There were three bidders—William L. Elder Paving and Construction Company, Patrick Finnigan & Sons and Warner-Quinlan Company. All the bids were referred to the Commissioners for Opening Streets, together with a bid for paving 29th St., from Huntingdon to Hampden Aves., with vitrified bricks.

Kansas City, Mo.—The Wyandotte County Commissioners have let a contract to A. J. Armstrong for building one mile of macadam road from the end of the Parallel road, north to Piper on the county line. Armstrong's bid was 61 cts. a sq. yd.

Syracuse, N. Y.—Bids for nearly \$3,500 worth of new cement sidewalks were received by the Board of Contract and Supply. For about two-thirds of the work the lowest price bid was but 8.5 cts. a sq. ft., which is below the general average for several years. Proposals were received for ten contracts. The largest of the contracts was for 13,900 sq. ft. of sidewalk on the south side of Free St., from Park St. to Fourth North St. and 1,000 sq. ft. of crosswalks. The lowest bid was \$1,314.50 by Cospido & Lamano.

Elizabeth, N. J.—The Standard Bitulithic Co. was the sole bidder for the paving of Park Ave. Amount of bid was \$22,952.20.

New York, N. Y.—The Eon Engineering and Contracting Co. furnished the lowest bid, at \$178,943.80, for widening roadway of Myrtle Ave., from Brooklyn Borough line to Cooper Ave., Glendale, about 1½ miles, repaving with improved granite blocks and with old granite blocks split and redressed, on concrete foundation. Roadway is to be widened by taking 2½ ft. of sidewalk on either side.

Nyack, N. Y.—The Bergen County Bd. of Freeholders has awarded to Edwin C. Humphrey, of Hackensack, a contract to build about 1 mile of road on Fort Lee turnpike, at a cost of \$70,329.60.

Columbus, O.—The following contracts have been awarded by the State Highway Dept.: (1) Ed. Bean, Highland, O., for grading and paving with water-bound macadam the Belfast-Fairfax road in Jackson township for a distance of 7,920 ft. Contract price, \$6,700. (2) Grahn & Kinnear, Columbus, O., for grading and paving with a concentrated-sulphide-liquor-treated slag macadam the Wauseon Delta road in Clinton township. Length, 5,371 ft. Contract price, \$7,125. (3) Northern Construction Co., Belvue, O., for grading and paving with water-bound macadam the West Center road in Bloom township. Length, 5,370 ft. Contract price, \$4,310. (4) Northern Construction Co., for grading and paving with water-bound macadam the Kilbourne road in Eden township. Length, 5,280 ft. Contract price, \$4,780. (5) Jos. S. Smith, Salem, O., for grading and paving with brick the Salem Ellsworth road in Perry township. Length, 5,280 ft. Contract price, \$15,825.

Lawton, Okla.—Bids were received by Capt. G. M. Cralle for construction of new macadam roads at Fort Sill during the winter months. Approximately \$20,000 will be expended. The Mississippi Valley Construction Co., of St. Louis, furnished the lowest bid.

Philadelphia, Pa.—The Camden County Board of Freeholders awarded contracts to Gibbs & Co., for the construction of the following roads, on condition that the abutting property owners consent to pay 10 per cent. of the cost of construction: Blackwood turnpike, from

city line to Bellmawr, on a concrete base with "Amiesite" top, \$72,569.62; Cuthbert road, from the Haddonfield turnpike to the White Horse road, with "Amiesite," \$19,890.15; Blackwood to Clementon, \$59,638.80. On the Clementon end of the road 4,000 ft. is to be "Amiesite," and on the Blackwood end 4,500 ft. is to be "Amiesite," and between these points the construction is to be of macadam.

Dallas, Tex.—The contract for the paving of Pennsylvania Ave., from Colonial to Oakland Aves., was awarded by the Board of Municipal Commissioners to the Texas Bitulithic Company, whose bid was \$29,565.54.

Sherman, Tex.—The Creosoted Wood Block Paving Co., of New Orleans, has been awarded a contract for paving seven blocks in the business section.

Everett, Wash.—Contract for improving 16th St., between Rucker Ave. and Chestnut St., was awarded to the Atlas Construction Co. The cost will be \$22,852.47.

Walla Walla, Wash.—A contract for the construction of 5 miles of state road has been awarded to L. Lanning for \$38,900.

BRIDGES.

Bids Asked and Prospective Work.

Anniston, Ala.—Plans are being prepared for a concrete bridge to be erected for the city under the direction of Street Superintendent W. E. Parker.

Chatham, Ala.—The Court of County Commissioners will receive bids until Dec. 2 for the construction of two steel bridges with concrete floors. W. S. Keller, Montgomery, is State Highway Engineer.

Tombstone, Ariz.—The Bd. Co. Spvrs. of Cochise Co. is planning the construction of a steel bridge, 80 ft. long and 16 ft. wide, across the San Pedro River.

Little Rock, Ark.—It has been decided by the county road and bridge commissioner to build a new bridge on what is known as the Box Rd. over Bayou Meto. Repair work on a bridge which connects Gray and Mineral townships is also being planned.

Paragould, Ark.—The Green County Court has appropriated \$12,000 for the construction of roads and bridges.

Glendale, Cal.—Bids are being advertised for by the County Supervisors for two large bridges to span the wash just north of this city, where so much damage was done several years ago by the storm water.

Sacramento, Cal.—Plans are completed for a 1,200-ft. bridge over Stony Creek near Orland, Glenn County. It will cost \$150,000.

Santa Barbara, Cal.—Bids will be received up to Dec. 2, by the Board of Supervisors for the construction of a bridge across Santa Monica creek on the Coast highway. Also for a bridge across Sutton Slough in the town of Carpinteria. C. A. Hunt is Clerk of the Board.

Washington, D. C.—Sealed proposals will be received by the Commissioner of Indian Affairs, Washington, D. C., until Nov. 26 for furnishing materials and labor for the erection of a riveted steel highway bridge across the Little Big Horn River, Crow Indian Reservation, Mont., in accordance with the plans, specifications, and instructions to bidders, which may be examined at the Indian Office, Washington, D. C., the office of the Supervisor of Construction, Denver, Colo.; the American Contractor, Chicago, Ill.; the Improvement Bulletin, Minneapolis, Minn.; the United States Indian warehouses at Chicago, Ill., St. Louis, Mo., Omaha, Neb., and San Francisco, Cal.; the Builders and Traders' Exchange, St. Paul, Minn., and at the school. For further information apply to the Superintendent of the Crow Indian School, Crow Agency, Mont.

Bradentown, Fla.—Two bridges will be constructed across Jacques and Well creeks. Address Clerk.

Marianna, Fla.—The Board of Commissioners of Jackson County will award contracts for constructing two bridges on county roads. Address J. M. Barnes, Commissioner.

Sanford, Fla.—A new steel bridge is to be erected over the St. Johns River at the foot of Celery Ave.

Lewiston, Idaho.—It is reported that the city is considering the construction of a steel drawbridge across the Clearwater River. D. C. Wrighter is City Engr.

Charleston, Ill.—At a meeting of the Bridge Committee of the county board and the Commissioners of Highways of

Paradise township, it was decided to build a bridge across the creek near the Buttermilk school house, the cost to be about \$1,500. Address County Clerk.

Chicago, Ill.—Approval of plans for the construction of a new bridge across the Chicago River at Lake St. have been given by the Finance Committee of the city council. Estimates place the cost of the bridge at \$400,000, one-third of which is to be paid by the Oak Park Elevated Railroad.

Kokomo, Ind.—Ways and means are being considered for a new bridge at Washington St. Address City Engineer.

South Bend, Ind.—The County Board plans to build a bridge at Washington Ave. Address County Auditor.

Franklinton, La.—The police jury has ordered a bridge built across Peters Creek near Bagaluba, which will open up a roadway to the banks of Pearl River to the proposed site for the steel bridge to be built connecting Washington Parish, La., and Pearl River, Miss.

Annapolis, Md.—The Anne Arundel County Commissioners have decided upon the site for the bridge across Stoney Creek, in the third district, the construction of which was authorized by an act of the last legislature. The width of the creek, where the bridge will be erected, is about 700 feet. The bridge will cost \$12,000. Address County Engineer.

Oldtown, Me.—Proposals will be received by the State Commissioners of Highways at the highway department, Augusta, Me., until Nov. 26, for furnishing all material and building the masonry abutments and a steel highway bridge over one branch of the Penobscot River at Oldtown, Me. The length of the bridge will be 208 ft. center to center of end pins, and about 600 cubic yards of masonry will be required. Contracts will be awarded separately for the masonry and the superstructure. Specifications may be had by enclosing one dollar and applying to E. E. Greenwood, Skowhegan, Me.

Hattiesburg, Miss.—The Board of Supervisors has agreed to construct all bridges in Forrest county of steel. This decision was reached for the reason that the flooring and other parts of bridges need repairing once a year. The board proposes to advertise for bids on six bridges at its December term. They have under advisement the question of making cement flooring.

Oxford, Miss.—Bids will be received for the construction of standard reinforced concrete bridges and culverts and steel bridges. Address Road Commissioner.

New Brunswick, N. J.—Sealed proposals will be received by the Board of Chosen Freeholders at their rooms in the County Record Building, at New Brunswick, on Monday, Nov. 25, at 2:30 o'clock, for building a concrete and steel bridge over Keasby Creek, Keasby Ave., Woodbridge Township, Middlesex County, N. J., according to plans and specifications on file at the office of Alvin B. Fox, County Engineer, Perth Amboy, and at the office of Thomas H. Hagerity, County Collector, New Brunswick, N. J.

Albany, N. Y.—The State Commission of Highways will receive until Dec. 2 sealed proposals for the building of the following: Washington County: South Bay Bridge, west of Whitehall, N. Y. Maps, plans, specifications and estimates may be seen and proposal forms obtained at the office of the Commission in Albany, N. Y.

Rochester, N. Y.—The Ballantyne Bridge has been condemned by the State Department of Highways, and a new bridge will probably be erected in the spring at a cost of about \$25,000.

Akron, O.—Sealed proposals will be received at the office of the Board of County Commissioners of Summit County, O., until Nov. 25, for the construction of the superstructure of the State St. Bridge over the canal at Barberton. Address O. C. L. Bower, Clerk.

Toledo, O.—An ordinance was passed authorizing and directing the director of public service to enter into a contract for the construction of the Ash-Consaul St. Bridge. Address John M. Babcock, Clerk of Council.

Philadelphia, Pa.—The Commissioners of Carbon County have decided that a new bridge is needed over Wild Creek, in Penn Forest township.

West Chester, Pa.—The Bd. Co. Comrs. of Chester Co. has been petitioned by the residents of West Pikeland Twp. for the construction of a new bridge over Pine Creek.

Tomah, Wis.—The city of Tomah expects to build a concrete bridge, in the spring, over the Lemonweir River at the north end of Superior Ave.

Bids Received and Contracts Awarded.

Chico, Cal.—The board of trustees has awarded Mory Brothers the contract for the alterations and improvements of the Dayton bridge. They will remove the cement piers in the middle of the stream and will construct an overhead suspension to support the bridge.

Marysville, Cal.—A contract for constructing four bridges along the state highway in this county was awarded by the supervisors to the Portland Pile and Concrete Company.

Santa Barbara, Cal.—The supervisors have awarded to James Donohue a contract for the construction of three bridges.

Michigan City, Ind.—The contract for the Place Bridge across the Kankakee has been awarded to the Rochester Bridge Co. The cost will be \$11,000.

Franklin, La.—The Police Jury has awarded contract for the building of the bridge across Bayou Teche at Chareton to the Jeffrey Iron Works, of Jeanerette.

Calumet, Mich.—The Illinois Bridge Company has been awarded the contract for the construction of reinforced concrete bridges across the Pilgrim and Otter rivers as part of new Houghton-Otter Lake road.

Carthage, Mo.—The contract for the new bridge over Spring River, northwest of Carthage, known as the Lower Spring River bridge, was let to the Illinois Bridge Company.

Twin Bridges, Mont.—The Continental Bridge Company, of Chicago, has been awarded the contract to build a steel bridge across the Jefferson River, opposite Silver Star.

Cleveland, O.—The lowest bid for erecting 11 secondary piers and high level bridge was \$497,000, submitted by the Great Lakes Dredge & Dock Co.

Lima, O.—Contract was awarded by the County Commissioners to J. J.

missioners have awarded to the Coast two concrete bridges, the Mosier bridge in Richland township, and the Burkholder bridge in Monroe township.

Urbana, O.—The contract for the North bridge over the Hooley ditch in Salem township was awarded by the county commissioners to Ed. Knotts.

Philadelphia, Pa.—The contract for repairs to College Ave. bridge, Yardley, was awarded by the Bucks County Commissioners to Carl R. Camp, of Philadelphia.

Ft. Worth, Tex.—The contract for the construction of a new concrete bridge across Seventh St., near City Park, has been awarded to the Tarrant Constr. Co., at \$106,772.

Brigham City, Utah.—The Co. Comrs. of Boxelder Co. have awarded the contract for the construction of five steel bridges over the Malad River, a number of bridges over smaller streams and repairing the bridges over Bear River to the Omaha Structural Steel Works for \$29,000.

Davenport, Wash.—The County Commissioners have awarded to the Coast Bridge Company a contract for the erection of three steel bridges for \$4,700. The commissioners intend to advertise for bids to construct culverts for which it is estimated that 170,000 ft. of lumber will be required.

BONDS.

Ontario, Cal.—The bid of Torrance Marshall Co. for the first portion of the \$72,000 road bond issue was rejected and the bonds will be readvertised at once.

Ventura, Cal.—An election will be held to vote on the question of issuing bonds for building a system of county good roads. Address F. W. Ewing.

Seneca Falls, N. Y.—Bonds to the amount of \$20,000 have been sold for street improvements on Clinton, Rumsey and West Fall Sts.

White Plains, N. Y.—A popular vote on the issue of bonds to the amount of \$63,000 will be taken at the coming village election. The money is to be used for paying the village's share of cost of repairing Post Rd., So. Broadway and Westchester Ave.

Bowling Green, O.—\$50,000 of 5 per cent. stone-road bonds have been awarded to Hayden, Miller & Co., of Cleveland.

Bryan, O.—\$60,000 in bonds has been voted for paving. Contracts will be awarded during the winter. Address City Clerk.

Cincinnati, O.—Bond issue aggregating \$60,000 for sewer and street improvements have been passed by the city council; and another issue of \$46,500 for the improvement of Vine, Kessler and Vaney Sts. and Schultz Alley has been referred to the Committee on Ways and Means for recommendation. Address City Clerk.

Cleveland Heights, O.—Bids will be received until Dec. 17 for the purchase of \$7,000 paving bonds, payable 1914 to 1922. Address H. H. Canfield, Clerk.

Columbus, O.—Two bond issues for the building of bridges over Alum Creek have been carried by popular vote. One calls for \$80,000 for a bridge at Alger Rd., and the other for \$30,000 for a bridge in the Schrock Rd., near Westerville.

Wellington, O.—The \$15,000 ten-year, 5 per cent. street improvement bonds were awarded to the Tillotson & Wolcott Co., of Cleveland.

Knoxville, Tenn.—An ordinance has been presented for the issuing of \$8,000 bonds for paving Oklahoma Ave.

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Annual Convention of the Southern Appalachian Good Roads Association

The Fifth Annual Convention of the Southern Appalachian Good Roads Association was held at the Hotel Piedmont, Atlanta, Georgia, November 20 and 21. The first session was called to order at 9:30 A. M., by the President, Dr. Joseph Hyde Pratt. After the opening prayer by Rev. Hugh K. Walker, addresses of welcome were made as follows: For the State of Georgia and City of Atlanta, Judge John S. Candler; for Fulton County, S. B. Turman, member of the Board of County Commissioners; for the Chamber of Commerce of Atlanta, Hon. Wilmer L. Moore, President.

Dr. Joseph Hyde Pratt responded in behalf of the Association; C. E. Scott, Highway Engineer of Lynchburg, responded for the State of Virginia; Charles P. Light for West Virginia; W. E. Breeze, Jr., for North Carolina; Joseph F. Bosworth, for Kentucky; J. N. Fisher for Tennessee; Hon. William G. Sirrine for South Carolina, and Congressman John L. Burnett for Alabama.

The responses were followed by the reports of officers and the appointment of committees, after which an address was made by Hon. E. J. Watson, Commissioner of Agriculture, Commerce and Industries, of South Carolina.

The afternoon session opened at 2:30 o'clock with the reading of reports on road work in the Southern Appalachian states. A report for Virginia was read by Hon. P. St. Julian Wilson, State Highway Commissioner; for West Virginia, by Hon. Charles P. Light, former State Highway Commissioner; for North Carolina, Dr. Joseph Hyde Pratt, State Geologist; for South Carolina, Hon. William G. Sirrine and Hon. John G. Green; for Georgia, Hon. R. J. Freeman, Commissioner of Roads and Revenues of De Kalb County; for Alabama, Hon. G. N. Mitcham, Highway Commissioner, and Hon. John Craft, President of the Alabama Good Roads Association; for Tennessee, Wilbur A. Nelson, Assistant State Geologist, and for Kentucky, Hon. Joseph F. Bosworth. During the reading of these reports discussions were held on the road problems of the various states, and statistics were presented bearing on the subject.

After the reading of the reports and discussions, Hon. E. Lee Worsham, Chairman of the Executive Committee, National Conservation Congress, gave an address on "Good Roads and Conservation."

The reports of several good roads associations were read as follows: Georgia Good Roads Club, Fred S. White, President; Alabama Good Roads Association, John Craft, President; North Carolina Good Roads Association, H. B. Varner, President; East Tennessee Good Roads Association, J. N. Fisher, President; Knox County (Tenn.) Road and Park Good Roads Association, Cyrus Kehr, President; North Georgia and North Alabama Good Roads Association, Albert N. Tumlin, President; Asheville and Buncombe County (N. C.) Good Roads Association, Dr. C. P. Ambler, President. These reports brought out several good ideas of what good roads associations can accomplish towards furthering the progress of highway improvement.

At the evening session, which opened at 7:30 o'clock,

223.
Congressman J. N. Burnett delivered an address on the subject of "Federal Aid for Good Roads." A lecture on the "Roads of the Southern Appalachian Region," illustrated with lantern slides showing the roads and the scenery along them, was delivered by S. W. McCallie, State Geologist of Georgia.

The morning session of the second day consisted of an automobile drive over some of the roads of Fulton County. Upon the return of the party a luncheon was tendered the delegates and visitors at the Piedmont Driving Club by the Fulton County Commissioners, the Atlanta Chamber of Commerce and the citizens of Atlanta.

At the afternoon session C. C. Gilbert, President of the Memphis-Bristol Highway Association, delivered an address on the subject "What Tennessee is Doing for National Highways." A discussion on "Convict Labor in Public Road Construction" was led by Dr. Joseph Hyde Pratt and R. E. Davison, Chairman of Prison Commission of Georgia. Following this discussion reports on special highways of the Southern Appalachian states were presented as follows: Memphis-Bristol Highway (illustrated), by E. J. Ducey, Highway Engineer; Bristol-Washington Highway by C. E. Scott; Central Highway of North Carolina by H. B. Varner, Chairman Central Highway Committee; Asheville-Greenville Highway by Walter B. Smith, Hendersonville, and W. G. Sirrine, Greenville, S. C.; Knoxville-Atlanta Highway by Cyrus Kehr, Tennessee; Crest of the Blue Ridge Highway by Dr. Joseph Hyde Pratt. These reports were followed by the reports of the Resolution and Finance committees and that of the Committee on Nomination and Next Meeting Place and the election of officers. Dr. Joseph Hyde Pratt was re-elected President and Treasurer, and H. B. Varner was re-elected Secretary. The following were elected members of the Executive Committee: S. W. McCallie, Atlanta, Ga.; J. N. Fisher, Morristown, Tenn.; Dr. A. Cheatham, Durham, N. C.; John Wood, Spartanburg, S. C.; Charles P. Light, Martinsburg, W. Va.; Robert C. Terrell, Frankfort, Ky.; P. St. J. Wilson, Richmond, Va.; Doctor C. P. Ambler, Asheville, N. C.; W. T. Winn, Atlanta, Ga.; W. G. Sirrine, Greenville, S. C.; W. S. Keller, Montgomery, Ala.

The following vice-presidents, one from each state, were elected: Alabama, John Craft, Mobile; Georgia, Prof. C. M. Strahan, Athens; Kentucky, Peter Lee Atherton, Louisville; North Carolina, E. C. Chambers, Asheville; South Carolina, Arch B. Calvert, Spartanburg; Tennessee, Cyrus Kehr, Knoxville; Virginia, William H. Aston, Meadow View; West Virginia, Howard Sutherland, Elkins.

Election of officers was followed by talks from representatives of local good roads associations, and an address on the subject "Sound Road Building Policies," by Prof. C. M. Strahan, of the University of Georgia.

Several resolutions were adopted by the delegates. The first resolution recommended a reiteration of the principals upon which the Association was formed, a strict adherence to the original plans of the organization and a renewal of the effort that has been put forth in prosecution of the work up to this time. The work of the state and county officials of the states represented in the Association

was commended in this resolution, as was also the increasing interest in the courses in highway engineering among the various educational institutions of the country. Federal aid in highway improvement was also endorsed in this resolution. In this same resolution the association went on record as being in favor of using the state convicts for the construction of public roads, and the abolishment of all forms of leasing convicts; the providing of a maintenance fund by the state and county and a more extended use of the split log drag. Another resolution was passed declaring that it was the sense of the association that no state should permit any of its towns or counties to issue bonds for good roads without providing an adequate sinking fund with which to retire such bonds at maturity, and also making provision that neither the interest nor principal should be used for any other purpose. In another resolution the association favored the authorization of the construction of a stretch of seven miles on the route of the Central Highway of North Carolina up the eastern slope of the Blue Ridge Mountain, which has not yet been provided for by the General Assembly of North Carolina. Another resolution endorsed the construction of a similar stretch along the route of the Crest of the Blue Ridge Highway between Highlands, North Carolina and Cornelia, Georgia.

Good roads trains that are run from time to time by various railroads were endorsed in another resolution. A resolution was also passed favoring the establishment of "Good Road Days" in the various states, similar to that observed by Alabama.

Another resolution registered a protest against the driving of vehicles at unduly high speed along the highways. A resolution was also passed extending the thanks and appreciation of the association to the Board of County Commissioners of Fulton County, the Chamber of Commerce of Atlanta, the Capital City Club, the Mechanical and Manufacturers Club and the Piedmont hotel. The press was also thanked for its courtesy in another resolution.

It is estimated that about two hundred delegates attended the convention.

Good Roads Discussed at Meeting of Maine Automobile Association

Good roads formed the predominant subject of discussion at the meeting of the Maine Automobile Association, which was held at the New Falmouth Hotel, Portland, November 11. The primary object of the meeting was to assemble representatives of all the various organizations interested in good roads in the state, and, if possible, arrange for some definite plan of action suitable for submission to the state Legislature at its session next January. The meeting was presided over by Governor-elect Wm. T. Haines, who is a well known good roads advocate.

Among the organizations which were represented at the meeting were the Maine State Board of Trade, the Maine State Grange, the Aroostook County Good Roads Association, the Bath Merchants' Association, the Bath Board of Aldermen, the Bangor Automobile Association and the Rockland Automobile Association. A representative of the United States Office of Public Roads was also in attendance.

Among the guests of the association, who were entertained at a dinner given at the hotel before the meeting, were Governor-elect Haines, State Highway Commissioner P. L. Hardison, E. W. Libby, secretary of the Maine State Grange, and several of the representatives of the other organizations represented at the meeting.

The principal speakers were Prof. Geo. T. Files, of Brunswick, chairman of the good roads committee of the Maine Automobile Association, and Lyman H. Nelson,

chairman of the good roads committee of the Maine State Board of Trade. Prof. Files stated that the Maine Automobile Association was in favor of good roads for all the citizens of Maine, not for owners of automobiles alone. Mr. Nelson reviewed the history of the good roads movement in Maine and spoke of the work done in securing the approval of the \$2,000,000 bond issue for good roads at the recent election. Both Prof. Files and Mr. Nelson spoke of the desire to present the needs of Maine in the matter of good roads to the Legislature. Among other speakers were E. W. James, of the United States Office of Public Roads; E. W. Libby, secretary of the Maine State Grange, and Hon. John C. Scates, secretary of the Maine Automobile Association. Mr. Scates read the text of a proposed new highway law which had been prepared for the association and which contained what were considered the best features of other state highway laws now in effect throughout the country. The various provisions of the proposed measure were discussed and criticized by the delegates. The general opinion of the proposed measure was favorable and after slight changes have been made it will be presented for final discussion at a meeting to be held at some future date when definite action will be taken in the matter of submitting it to the Legislature.

Road Work Under New Bond Issue in New York

An announcement, which has been issued by the State Department of Highways of New York, states that in anticipation of the passage of the \$50,000,000 bond referendum, which was approved by the voters of the state at the election on November 5. State Superintendent of Highways C. Gordon Reed, some time ago directed the draftsmen and engineers in the department to prepare plans and specifications for the first letting of highways to be constructed under the new bond issue.

This work has been carried on since that conducted under the former appropriation was finished, with the result that plans and specifications are already completed, covering a large mileage of new state highways to be built in the various counties of the state.

According to the announcement, as soon as the next Legislature makes the necessary appropriations under the bond issue, bids will immediately be advertised. It is expected that the first letting will be held some time in January, and the actual work of construction commence early in the spring.

Among the new roads to be built under the present plans is a stretch of 1.28 miles in Matteawan Village, and one of 10.74 miles between Wassaic and Dover Plains in Dutchess County. In Putnam County, part 2 of the Peekskill-Fishkill Road, 2.38 miles long, will be built. In Rockland County the Haverstraw-West Haverstraw Road, 1.59 miles, the road from Nyack to the New Jersey State Line, 2.90 miles and the Spring Valley and Suffern Village Road, 3.58 miles, will be built. In Ulster County a stretch 1.94 miles long between Perrines and Rosendale, and one 3.87 miles long will be constructed, between New Paltz and Plattekill. In Westchester County the Croton Landing-Peekskill Road, 8.14 miles long, the Crafts Corners-Vista Road, 4.72 miles long, and a stretch in Ardsley Village, 1.46 miles long are to be constructed.

The Iowa Good Roads Association will hold its annual convention in Des Moines sometime in December. The exact date has not yet been decided upon. The program is being arranged by a committee which was selected at a recent meeting of the Executive Committee of the Association. One of the plans of the association is to promote the passage of a bill providing for a beginning on the construction of a system of permanent roads in the state.

GOOD ROADS

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Proposed Southern Route for Transcontinental Road

The Chamber of Commerce, of Richmond, Va., has started a movement to interest a number of the more important cities in the southern tier of states in the proposition to construct a modern road from Los Angeles to Hampton Roads.

It is believed by the members of the Chamber of Commerce that a southern route for a coast to coast road would possess points of advantage over the several proposed transcontinental routes which are now being agitated, most of which pass through Chicago and terminate at New York.

The principal inducement which such a route would offer over the more northerly highways is the fact that the milder climate would permit year-round travel by automobile instead of confining touring to the summer and fall months, which, it is generally admitted, comprise the season in which travel is a pleasure or even generally possible through the northern states.

In a letter sent out by Secretary Dunlop of the Richmond Chamber of Commerce to the business associations of the cities along the proposed route, attention is called to the importance of, and the opportune time which exists for making a concerted effort to secure the construction of a southern transcontinental highway with an eastern section passing through Virginia and terminating at Hampton Roads.

Of the highway routes already seriously contemplated, one runs from Seattle via St. Paul and Chicago to New York, one from San Francisco via Denver and Chicago to New York, one from Los Angeles via Santa Fe and Chicago to New York and a fourth from Los Angeles via Santa Fe, St. Louis, Indianapolis, Columbus, Ohio, Wheeling, W. Va., and Philadelphia, to New York.

It is pointed out that all of the above routes are subject to climatic conditions which render them useless, or at least unpleasant, for automobile touring from three to five months in the year.

In Mr. Dunlop's letter it is claimed that "As the logical location, for utility and pleasure, of such a highway is unquestionably through the temperate zones of a more southern latitude we can, it is believed, certainly enlist the co-operation and interest of all the cities and states west of

Virginia and south of those more northern roads in a movement to promote a highway as follows: From Los Angeles, Cal., via Santa Fe, N. M., Amarilla, Tex., Oklahoma City, Guthrie, Tulsa and Muskogee, Okla., Hot Springs, Fort Smith and Little Rock, Ark., Memphis, Nashville and Knoxville, Tenn., Bristol, Abingdon, Wytheville, Pulaski, East Radford, Christiansburg, Roanoke, Bedford City, Lynchburg, Farmville, Burkeville, Crewe, Blackstone, Petersburg, Richmond and Williamsburg, Va., to the Hampton Roads cities of Newport News, Norfolk, Portsmouth and Hampton."

It is further shown in the letter that this highway, if built, would connect at Los Angeles with good highways already established between that city and San Francisco, and from there up the Pacific coast to the cities of Portland, Tacoma and Seattle, and in the East would connect at Richmond with the Quebec-Miami Highway.

In his letter Mr. Dunlop asks the business organizations of the various cities to send delegations to a preliminary meeting to be held at Richmond for the purpose of investigating the situation and its prospects, stating that at the same time the Richmond Chamber of Commerce would be willing to send its delegation to any other city which might be chosen by a majority of the cities interested. Mr. Dunlop was instructed to make this proposition by the Committee on Streets, Roads and Parks of the Richmond Chamber of Commerce.

Trolley Line Barred From Pennsylvania State Roads

Governor John K. Tener of Pennsylvania has refused to approve applications for charters for new street railways and for the extension of existing lines on portions of the state highways.

Under the corporation laws of the state the Governor is required to pass upon all charters for railroads, and no traction or other transportation company may lay a rail on a state highway without authority in its charter, and then only if a permit is obtained from the State Highway Commissioner.

The recently adopted system of state highways covers practically every principal route in the state, and the use of these roads which have been reconstructed and graded at public expense, will probably be restricted, by this administration at least, to vehicles and pedestrians.

While no official announcement has been made except the mere statement that the Governor has disapproved the applications, it is thought that his position was taken into the belief that within a comparatively short period trolley companies, like the steam railways, would be operating to a large extent over their own rights of way, the demands of speedy transportation, of shipping facilities, especially since they have begun to carry freight, and the use of large cars putting them into a position where they must have as much control as possible of property over which their tracks are laid. It has also been pointed out that to grant permission to trolley lines to use highways which have been reconstructed at considerable expense with public money, would be to furnish them with roadbeds already graded, underdrained, and in many cases ready for laying ties and track without much work or financial outlay on the part of the railway companies.

It is considered doubtful whether or not it will be advisable to adopt a policy whereby the state might lease the highways to the trolley lines and receive a rental such as some cities receive for streets, because it is expected that before long vehicular traffic on the state highways will become so great that all the available room will be needed for that purpose.

Coming Meetings

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec. 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Krauss, Harrison Bldg., Philadelphia, Pa.

Personal Notes

Robert M. Sias has been re-elected Surveyor of Galveston Co., Texas.

Charles A. Edel, Secretary of the Paving Commission of Baltimore, Md., died on Nov. 16.

Wellington D. Parker has been appointed Superintendent of Streets at Elizabeth, N. J.

The Warren Bros. Co., of Boston, Mass., is contemplating the erection of a plant at St. Paul, Minn.

George S. Tibbitts, of Oneida, N. Y., has been reappointed Superintendent of Highways for Madison County, for a term of four years from Jan. 1, 1913.

Walter J. O'Brien, assistant engineer in Maintenance Department of the State Highway Department, Utica, N. Y., has been transferred to the Construction Department of Watertown.

D. K. Edwards has been chosen Chairman of the Los Angeles Highway Commission, to succeed the late Thomas Early, and D. C. Teague has been appointed a member of the Los Angeles County Highway Commission.

General Notes

More than 300,000 sq. yds. of asphalt paving has been laid in Milwaukee during 1912.

A bridge having a 60-ft. steel span and 2,000 feet of trestle is being built across Black Creek, twelve miles west of Centralia, Wash.

A state road 12 miles long has been opened between Oakland and McHenry, in Garrett County, Md. A concrete bridge covers the road across Deep Creek.

The state highway fund of Wisconsin for 1913 amounts to \$378,000, while state aid to the amount of \$865,027 has been requested by various towns and counties.

It is announced that the Board of Estimate of Baltimore, Md., has been

petitioned for an appropriation of \$100,000 for building a viaduct at Woodbury.

Plans and specifications are being made for the system of macadam roads to be built in Grimes County, Tex., from the proceeds of a bond issue of \$125,000 recently authorized.

A pike leading from Hopkinsville, Ky., to Nashville, Tenn., is being planned by citizens of the counties interested, who recently held a rally to formulate plans for the project.

The Board of Supervisors of El Dorado County, Cal., has offered free a right of way for the state highway, and have agreed to build bridges where necessary along the route.

It is reported that the Supervisors of St. Lawrence County, N. Y., have practically decided to designate the Gouverneur-Edwards Rd. as a state highway to be built under the recent appropriation.

The proposed plan to convert Dale Avenue into a boulevard leading from Savannah to Thunderbolt, Ga., has been favorably received by the Board of County Commissioners of Chatham County.

Plans have been exhibited of the proposed bridge across the Mississippi River at Third Ave., Minneapolis. Both 1-span and 2-span types are being considered, the cost being estimated at from \$650,000 to \$750,000.

The Board of Public Works of Louisville, Ky., is endeavoring to obtain the Mayor's consent to a tax-rate increase, which would bring the fund available for street construction to about \$325,000.

The Good Roads Committee of the Commerce Club, Pueblo, Col., is co-operating with the Public Auto Club in a campaign undertaken to increase the active membership of the Colorado Good Roads Association.

The State Highway Commission of California has authorized surveys for two new roads, one between Placerville and Folsom, and the other from Glendora to Pomona and thence through Ontario to Riverside.

The commissioners of Tuscarawas County, Ohio, have been conferring with Stark County officials on the advisability of constructing a brick road from Canal Dover to Canton, passing through Mineral City and Sandyville.

The State Highway Engineer of Kansas, is reported to be advocating a plan for narrowing all state highways to 30 ft., in order to avoid undue waste of land, the unused strips on either side to revert to the adjacent owners.

The merchants of Smith Center, Kan., and the farmers of the surrounding country have co-operated in raising a large sum of money for the purpose of building a first-class road from that city to the state line, a distance of 15 miles.

Plans are being prepared for the construction of two bridges across the Wabash River in Vigo County, Ind. It is estimated that both can be built for about \$150,000; and it has been suggested to impose a 10-ct. levy for two years in order to raise this sum.

Business men of three parishes in Louisiana—Baton Rouge, West Baton Rouge and Plaquemine and Iberville—have organized a "Sixth District Good Roads Movement" to work for the construction of trunk roads connecting the three parishes.

The town of Sebewainy, Huron County, Mich., has constructed an experimental mile of highway, half of it built of concrete and the other half of bituminous macadam, on the comparative durability of which will depend the type of construction to be adopted for new highways in the coming year.

An earth road one mile in length was recently built in the town of Warner, Muskogee County, Okla., in one day. Farmers furnished labor and teams free, while business men of Warner supplied funds for a concrete culvert.

The Ohio Good Roads Federation has voted an appropriation of \$500 to aid the Ohio State University in establishing a course of lectures on road building in connection with its engineering department. It is the university's aim ultimately to establish a highway department.

At the annual banquet of the Massachusetts Highway Association, held at the Quincy Hotel in Boston, on Nov. 14, the chief guest of honor was J. de Pulligny, Chief Engineer of the Board of Public Works of France, who is making an extensive study of highway conditions in this country as Director of the French Mission of Engineers to the United States.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

Date of letting	Reported in issue of
12-2 Los Angeles, Cal., st. work.....	11-30
12-2 Jeffersonville, Ind., gravel rds.....	11-30
12-2 Kentland, Ind., macadam rds.....	11-30
12-2 South Bend, Ind., road constr.....	11-30
12-2 Williamsport, Ind., rd. work.....	11-30
12-2 Pikeville, Ky., st. paving.....	11-9
12-3 Jacksonville, Fla., brick paving.....	11-23
12-3 Crawfordsville, Ind., gravel rds.....	11-30
12-3 Bloomington, Ind., gravel rds.....	11-30
12-3 Madison, Ind., gravel rds.....	11-30
12-3 Marion, Ind., gravel rds.....	11-30
12-3 Monticello, Ind., stone rd.....	11-30
12-3 Columbus, O., brick paving.....	11-16
12-4 Shelbyville, Ind., gravel rd.....	11-30
12-5 Jackson, Miss., gravel rd.....	11-30
12-9 Rome, Ga., st. paving.....	11-23
12-18 Fernandina, Fla., vit. brick pav.....	11-9

BRIDGES.

12-2 Chatom, Ala., two steel bridges.....	11-23
12-2 Santa Barbara, Cal., two bridges.....	11-23
12-2 Albany, N. Y., bridge.....	11-23
12-2 Elizabethtown, Tenn., steel bridges.....	11-30
12-2 St. John, N. B., bridge.....	11-30

MISCELLANEOUS.

12-2 Zanesville, O., bonds.....	11-16
12-3 Steelton, Ont., bonds.....	11-30
12-7 Pearsall, Tex., road bonds.....	10-19
12-17 Cleveland Heights, O., bonds.....	11-23

ROADS AND STREETS.

Bids Asked and Prospective Work.

Mobile, Ala.—The Co. Bd. is investigating the necessity of constructing a new road from Kipling to the property of the Mobile and Chicago Development Co.

Hermosa Beach, Cal.—The Chamber of Commerce has suggested the paving of all cross streets, from 1st to 26th, from the ocean front to Hermosa Ave.

Los Angeles, Cal.—Bids will be received until Dec. 2, by the Co. Bd. of Supvs. of Los Angeles Co. for the improvement of a portion of Eagle Rock Ave. The work will require 31,000 cu. yds. of excavation, 13.1 cu. yds. of class A concrete, 30 lin. ft. of 18-in. reinforced concrete pipe, and 750 lin. ft. of guard fence.

The Council has referred to the Sts. and Bldgs. Com. the question of repaving South Main St., between 10th and Jefferson Sts.

San Bernadino, Cal.—Supervisor Butler of the 1st Rd. Dist., will let a contract for the construction of 2.5 miles of permanent macadam roadway on Highland ave., from San Bernadino to Highland.

Hartford, Conn.—The City Engr. has made final measurements for the East Main st. paving work, and is drawing plans and specifications for the work to be let on contract.

Ocala, Fla.—On Dec. 3 bids will be considered by the City Council for paving part of Ft. King Ave. with vitrified brick. Address H. C. Sistrunk, Clerk.

Augusta, Ga.—The Sts. and Drains Com. of the City Council has decided to pave the street of the Margaret Wright Hospital.

Bloomington, Ill.—Improvements to coning, with concrete, of High St., between and 14,000 ft. of curbing have been decided upon for the following streets: Clay, from State to Mercer; Vale, from Grove to Clay; Mercer, from Washington to Clay. Estimated cost, \$52,481. Elmer Folsom is City Engineer.

Moline, Ill.—The City Council has passed an ordinance calling for the paving, with concrete, of High st., between 7th and 10th Sts. Engineer's estimate has placed the cost of the improvement at \$7,300.

Bloomington, Ill.—The Bd. of Comrs. of Green Co. will receive bids until Dec. 2 for the construction of 2 gravel roads in Jefferson Twp. Caswell H. Jennings is County Auditor.

The Co. Comrs. of Monroe Co. will receive bids until Dec. 3 for the construction of a gravel road in Bloomington Twp. Horace Blakely is County Auditor.

Crawfordsville, Ind.—Sealed bids will be

received until Dec. 2 for improvement of Simpson st., from north line of Main St. to south line of Market st., by the construction of cement walks, with curb and gutter on both sides, according to specifications on file in the office of the City Civil Engr. Address Fred B. Robinson, City Clk.

Bids will be received by the Bd. of Co. Comrs. of Montgomery Co. until Dec. 3, for the construction of six gravel roads. Bennett B. Engle is County Auditor.

Ft. Wayne, Ind.—Plans have been ordered for the paving of the alley between Wildwood and Kinniard Aves., from Beaver Ave. to Indiana Ave., and petitions granted for cement sidewalks on Maiden Lane. Assessment rolls have been approved for the paving of Wildwood ave., from Fairfield Ave. to Webster St.

Indianapolis, Ind.—The Bd. of Pub. Wks. has adopted resolutions for street improvements to the amount of \$63,643. Hearings will be held and contracts let during the winter, work to begin early next spring.

Jeffersonville, Ind.—Until Dec. 2 the Bd. of Comrs. of Clark Co. will receive bids for the construction of 3 gravel roads. G. W. Stoner is County Auditor.

Kentland, Ind.—The Bd. of Newton Co. Comrs. will receive bids until Dec. 2, for the construction of macadam roads in Jackson and McClellan Twp. E. R. Bringham is County Auditor.

Madison, Ind.—The Bd. of Comrs. of Jefferson Co. will receive bids until Dec. 3, for the construction of gravel roads in Madison and Milton Twp. A. M. Taff is County Auditor.

Marion, Ind.—The Co. Comrs. of Grant Co. will receive bids until Dec. 3 for the construction of gravel roads in Mill and Center Twp. E. H. Kimball is County Auditor.

Monticello, Ind.—The Bd. of Comrs. of White Co. will receive bids until Dec. 3 for the construction of a stone road in Prairie Twp. A. G. Fisher is County Auditor.

Shelbyville, Ind.—The Bd. of Comrs. of Shelby Co. will receive bids until Dec. 4 for the construction of a gravel road in Hendricks Twp. F. W. Fagel is County Auditor.

South Bend, Ind.—The Bd. of Co. Comrs. of St. Joseph Co. will receive bids until Dec. 2 for the construction of highways in Lincoln Twp. Clarence Sedgwick is County Auditor.

Williamsport, Ind.—Sealed bids will be received until Dec. 2, at the office of D. H. Moffit, Auditor of Warren Co., for improvement of the following highways in that County: The Elmer Foster and John C. Nern Free Gravel Rd., Prairie Twp.; length, 38,811 ft. Estimate cost of improvement, \$22,198.93. The James Dysert Free Gravel Rd., Prairie Twp. Length, 21,308 ft. Estimated cost of improvement, \$18,061.13. The Clayborn Orr Free Gravel Rd., Prairie Twp. Length, 13,336 ft. Estimated cost of improvement, \$12,090.84. The Sam Foster Free Gravel Rd., Medina Twp. Length, 9,897 ft. Estimated cost of improvement, \$9,685.53. The William McKinnis Free Gravel Rd., Medina Twp. Length, 7,387 ft. Estimated cost of improvement, \$7,780.78. Said sealed proposals shall be for the furnishing of all material and labor and the constructing of the improvements of each of said several highways respectively by grading, draining and paving with gravel and by constructing bridges, culverts and underground drains, all in accordance with the profile, report of the Civil Engineer and viewers and the plans and specifications, now on file in the Auditor's office.

Louisville, Ky.—The Bd. of Pub. Wks. has decided to pave 3d St. with asphalt, at an estimated cost of \$28,950.

Baltimore, Md.—The Paving Comrs. have decided to pave portions of 11 streets. Address Commissioner.

Flint, Mich.—The City Engr. has presented to the Common Council his estimates of the cost of gravelling a number of streets over which there is considerable traffic but on which it is not considered advisable to construct pavements. The estimated cost for 15 miles of road is \$63,460.

Minneapolis, Minn.—The Co. Comrs. have adopted a resolution ordering construction of concrete pavement on the Lake St. extension from St. Louis Park to Deephaven, a distance of nearly 6 miles. The

entire cost is estimated at \$60,000, of which amount \$15,000 has been offered by business men of Minneapolis.

Jackson, Miss.—The Highway Commission of the first and fifth districts of Hinds Co., Miss., will receive sealed bids until Dec. 5 for the construction of the Terry and Crystal Springs gravel Rd., according to the plans and specifications on file in the office of said commission. Address George W. Sarlls, Engr. Highway Comm.

Hannibal, Mo.—The Commercial Club is backing the proposition to repair the road leading from Wabash Bridge to Shepherd, Ill., or to select a new route between the two points.

Lamar, Mo.—The Lamar Township Road Club has been formed here for the purpose of promoting the building of six miles of the North and South State road, of which about 20 miles will lie in Barton Co. It is proposed to issue bonds of Lamar Twp. for \$20,000 for this work.

St. Joseph, Mo.—The Bd. of Pub. Wks. has sent to the City Council an ordinance providing for the paving, with asphalt, of 11th St., from Francis St. to Frederick Ave.

Bath, N. Y.—The State Highway Dept. announces that it will shortly advertise for bids for the paving of Liberty, East Steuben and West Washington Sts.

Buffalo, N. Y.—The Sts. Com. of the Bd. of Aldermen has voted in favor of repaving with asphalt Lancaster Ave., between Delaware and Elmwood Aves.

Cannastota, N. Y.—A petition has been presented to the Village Bd. asking for the paving with brick of parts of Main and Center Sts.

Kingston, N. Y.—Various towns of Ulster Co. are being levied upon for a total of \$71,923 for improvement and repair of highways and bridges.

Schenectady, N. Y.—Resolutions providing for the grading, curbing, paving and construction of sidewalks on Main St. are reported passed by the City Council.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Comr. until 2 o'clock p. m., Dec. 3, for grading and paving the following streets: (1) The Grassy Fork Rd., Mifflin Twp., Pike Co. Length, 11,070 ft., or 2.09 miles. Material to be used, waterbound gravel. Width of pavements, 10 ft. Estimated cost, \$3,558.60. (2) The Owl Creek Rd., Union Twp., Pike Co. Length, 10,560 ft., or 2 miles. Material, waterbound gravel. Width of pavement, 10 ft. Estimated cost, \$3,416. (3) The Sinking Spring Rd., Mifflin Twp., Pike Co. Length, 5,280 ft., or 1 mile. Material, waterbound macadam. Width of pavement, 12 ft. Estimated cost, \$4,452.40. (4) The Waverly and Beavertown Rd., Pee Pee and Seal Twp., Pike Co. Length, 5,280 ft., or 1 mile. Material, waterbound macadam and concrete. Width of pavements, 12 ft. Estimated cost, \$4,370.35. (5) The East Center Rd., Bloom Twp., Seneca Co. Length, 5,765 ft., or .09 miles. Material, waterbound macadam. Width of pavement, 10 ft. Estimated cost, \$5,020.18. (6) The Spiegel Grove Rd., Ballville Twp., Sandusky Co. Length, 1,336 ft., or 0.25 mile. Material, brick. Width of pavement, 12 ft. Estimated cost, \$4,615.50. In each instance the date set for completion is July 1, 1913. Plans and specifications are on file in the office of the Co. Comrs. and of the State Highway Dept.

Dayton, O.—The City Council has adopted a resolution declaring it necessary to improve Grand Ave., from Salem Ave. to Broadway.

Springfield, O.—The Council is considering the material to be used in paving city streets. Address City Engr. Carey H. Pratt.

Temple, Tex.—The Chamber of Commerce has a special committee on street paving working out a plan whereby the remaining unpaved portion of the business district and the greater portion of residence streets may soon be paved with durable material.

Seattle, Wash.—The City Council is having plans prepared for the improvement of Fremont Ave., N. 50th St.; Phinney and Greenwood Aves. to N. 85th St., by paving with asphalt. Estimated cost, \$283,000.

Spokane, Wash.—Surveys are being made for a road between Spokane and Freeman, a distance of 20 miles. The estimated cost is \$100,000.

Superior, Wis.—Plans for street improvements next year are being prepared by the City Engr.

Bids Received and Contracts Awarded.

Eagle Rock, Cal.—Robert P. Law, 1450 L. Trade Pk., was the lowest bidder, at \$17,000, for improving 6,500 ft. of Colorado Blvd. by grading, oiling, curbing, and building sidewalks and gutters.

Long Beach, Cal.—The lowest bid for improving Pine Ave., between Ocean and 10th St., was submitted by Fred Hoffman, at \$16,000.

Los Angeles, Cal.—The contract for the asphaltizing of Oregon Ave., with the installation of light posts and Washingtonia Robusta palms, has been let to Braun, Bryant & Austin, for a sum approximating \$145,000. The street is to be improved with a concrete base and asphalt wearing surface from 4th St. to the easterly city limits, a distance of almost two miles.

The Conner Contracting Co.'s bid of \$12,351.80 for improving 2.79 miles of the Compton-Clearwater County Rd. was the lowest received.

San Diego, Cal.—The C. L. Knight Co. has been awarded a contract at \$7,450 for the continuation of the R St. grading.

Canterbury, Conn.—D. L. Chilson, of Franklin, Mass., has been awarded a contract for 9,808 lin. ft. of gravel construction on the Worcester Turnpike, at \$16,933 for grading and \$1 per lin. ft. extra for telford base.

Norwich, Conn.—A contract for 9,026 lin. ft. of macadam and gravel construction has been let by the State Highway Comr. to Ahern Bros., of Willimantic, at \$2.45 per lin. ft. for macadam, \$3.15 for telford, and \$1.24 for gravel.

Windham, Conn.—The State Highway Comr. has awarded a contract to the A. Vito Construction Corporation, of Thompson, for 9,569 lin. ft. of gravel construction on the Brickton Rd., at \$1.39 per lin. ft. for gravel and \$2.39 for telford.

Dixon, Ill.—A contract for the construction of brick pavement around the court house has been awarded by the Bd. of Local Impts. to Rink & Snell at \$6,372.

Crawfordsville, Ind.—The following contracts for road improvement have been awarded in Union Twp.: Remley Rd., to F. A. Gageby, \$17,500; Stafford Rd., W. A. Irwin, \$8,290; Busenbark Rd., Mahoney & Stepp, \$10,500. In Clark Twp.: Thorp Rd., W. A. Irwin, \$11,700.

Monticello, Ind.—Contract for the construction of the John Kentnich stone Rd. has been awarded to Nathan C. Gibson, Idaville, Ind., for \$13,500.

Buffalo, N. Y.—Contracts are said to have been awarded by the Common Council to the German Rock Asphalt & Cement Co. for the paving of Elmwood Ave., Stanton and East Ferry Sts., for \$26,320.

East Liverpool, O.—Hinton & Cunningham presented the lowest bid for improving the unpaved portion of the Lisbon Rd. within the corporate limits. Their bid was \$16,792.60. McLaughlin & Allison bid \$17,947.60.

Speers, Pa.—Bids have been opened for 4,588 ft. of highway on main route No. 118. The Hallam Construction Company, Washington, was low bidder. No award has been made as yet.

Chattanooga, Tenn.—The contract for paving Whiteside St. has been awarded to the Key Arnold Construction Co., for \$7,354.

Summer, Wash.—A contract for paving certain streets with Warrenite has been awarded to Jos. Wartner, of Tacoma, for \$19,200.

BRIDGES.

Bids Asked and Prospective Work.

Pueblo, Colo.—Plans are completed for a 2-span bridge across the Arkansas River at Avondale. The estimated cost is \$5,000.

Muncie, Ind.—The Bd. of Co. Comrs. has been petitioned by residents of Muncie and Riverdale for a new concrete bridge to be erected across White River, at the end of W. Washington St.

Wichita, Kan.—The Co. Comrs. have made an appropriation of \$20,000 for the construction of 3 new bridges, to be located as follows: In Park Twp., a 280-ft. steel bridge with creosoted plank flooring; in Valley Center Twp., a 310-ft. steel structure; and in Minneha Twp., a 32-ft. steel and concrete bridge. Address County Clk.

Jackson, Miss.—Until Dec. 1 bids will be

received for the construction of a steel and concrete bridge over Hardy Creek on Jackson and Terry Rd.; for a concrete bridge over Gale Creek on Jackson and Terry Rd., and for a steel and concrete bridge over Hanging Moss Creek on Jackson and Livingston Rd. Address W. W. Downing, Clk.

South Bend, Ind.—At a recent meeting of the St. Joseph Co. Comrs. the specifications for a flat top beam bridge on South Carroll St., over the Bowman Creek, prepared by City Engr. Moore, were approved. County Aud. Sedgwick was directed to advertise for bids to be opened Oct. 14.

Dayton, O.—The Bridge Engr. has started work on plans for the new Keowee St. bridge.

Chester, Pa.—Plans have been submitted for the proposed bridge across Chester River at 5th St., at a cost of \$38,000. Address City Clerk.

Elizabethtown, Tenn.—E. H. Little, Chairman Co. Ct. Carter Co., will receive bids until Dec. 2 for the construction of steel bridges at Hampton, Milligan College and Sinking Creek.

Tomah, Wis.—It is contemplated to build a concrete bridge over the Lemonweir River at the north end of Superior Ave. Address City Clk.

St. John, N. B.—The Provincial Government will receive bids until Dec. 2 for the erection of the new traffic and street railway bridge to connect East and West St. John. The arch will be 730 ft. long and no steel work except a railing will show above the floor. The estimated cost is \$300,000.

Bids Received and Contracts Awarded.

Idaho Falls, Idaho.—The contract for construction of a bridge in Bingham Co. is reported awarded to Perham & Harris, of St. Anthony, at \$9,680.

Shreveport, La.—The superstructure of the wagon bridge across Red River, between Shreveport and Bossier City, will be constructed by the Modern Steel Structural Company, of Waukesha Wis., whose bid for the work was \$171,180.

Baltimore, Md.—The Max Ways Singer Pentz Construction Co. has secured a contract for erecting a bridge near the Lock Haven dam. The price is \$20,962.

Easton, Md.—The following bids have been received for construction of a bridge over Miles River: Edwin L. Micheau, Baltimore, \$59,145; Thos. Shehan, Richmond, Va., \$54,482.28; P. S. Ligon (2 bids, different type), \$61,500 and \$85,000; Raymond Concrete Piling Co., Baltimore, \$62,500 and \$51,500.

New York, N. Y.—Contracts have been awarded by the Dept. of Bridges to Leopold & Co., for repaving the north approach of 3d Ave. bridge over Harlem River, \$12,930, and for repaving east approach to Brooklyn Bridge, \$8,100.

Urbana, O.—The Co. Comrs. have awarded the contract for the Metz Bridge to Frawley Brothers.

Guthrie, Okla.—The Bd. of Co. Comrs. has let a contract for a bridge in Mulhall Twp. to W. R. Mitchell for \$500.

Pittsburg, Pa.—Bids have been received for the construction of three new bridges. The American Paving and Construction Co. and the McNichol Paving and Construction Co. were two of the lowest bidders.

Fort Worth, Tex.—Six bids have been received for the 7-mile bridge on the White Settlement approach to the new city reservoir, and have been referred to the engrs. The estimated cost is about \$25,000.

BONDS.

Santa Ana, Cal.—Bonds to the amount of \$1270,000 have been voted for the construction of about 107 miles of improved highways in Orange Co.

Bakersfield, Cal.—At a recent mass meeting the citizens of Kern Co. voted in favor of a bond issue of \$3,000,000 for the building of about 400 miles of permanent roads. A Highway Commission will be appointed to carry out the plans.

Bradentown, Fla.—The council has voted in favor of a bond issue of \$75,000 for use in constructing new bridges across Jacques' and Weir's creeks, paving additional streets, extending sewer system, etc.

Augusta, Ga.—\$200,000 of county bonds

have been voted for the construction of roads and bridges. Address E. F. Verdery, Chairman of the Board of County Commissioners, Augusta.

Paoli, Ind.—Bonds in the sum of \$21,100 have been ordered issued for the construction of the French Lick Twp. Rds.

Dayton, Ky.—\$20,000 paying bonds have been authorized by vote. Address Mayor.

Middlesboro, Ky.—The Advisory Committee of the Fiscal Court has called an election to vote on \$35,000 road bonds for Bell County.

Escanaba, Mich.—\$100,000 Delta County road bonds have been authorized by vote. Address John A. Semer, County Clerk.

Grand Rapids, Mich.—The proposed bond issue of \$175,000 for the Pearl and Butterworth St. bridge project was voted down. The question will probably be resubmitted in a somewhat different form next spring.

Joplin, Mo.—An election will be held on Jan. 14 to decide the question of issuing \$100,000 bridge bonds. Address Philip Arnold, Chairman.

Santa Fe, N. M.—The issuance of bonds to the amount of \$500,000, for the construction of good roads, has been favorably voted upon.

Grand Island, Neb.—Bids are being received for the purchase of \$27,000 10-year paving bonds. Address H. E. Clifford, City Clk.

Akron, O.—At a recent election the proposition was carried to issue bonds for the purpose of building the North Howard St. extension bridge. J. A. Gehres is City Engineer.

Findlay, O.—It has been voted to issue bonds to the amount of \$25,000 for the purpose of reconstructing bridges destroyed by floods.

Lorain, O.—Legislation authorizing the issue of \$32,607 in 4½ per cent. paving bonds has been enacted by the City Council.

Wellington, O.—It is reported that paving bonds to the amount of \$45,000 have been sold.

Souderton, Pa.—Road bonds to the amount of \$25,000 have been authorized. Address Borough Clerk.

Nashville, Tenn.—It has been voted to issue \$150,000 bonds for opening and widening streets.

Conroe, Tex.—An election will be held on Dec. 23 to vote on a \$250,000 bond issue for good roads in Montgomery Co.

Groveton, Tex.—An election is to be held on Dec. 10 to vote on the issue of \$60,000 in bonds for the construction of good roads.

Port Lavaca, Tex.—An election is to be held to decide the question of issuing \$150,000 good road bonds. Address Mayor.

Port Angeles, Wash.—A bond issue of \$300,000 has been voted for the construction of good roads in Clallam Co.

Steeltown, Ont.—J. Robinson, Town Clk., will receive bids until Dec. 3 for \$15,500 bonds for the construction of a macadam pavement.

Plainview, Tex.—The city election on a bond issue of \$12,000 for street and sidewalk improvements has been carried.

Edmonds, Wash.—Bonds to the amount of \$250,000 have been voted for street improvements.

Seattle, Wash.—A bond issue of \$3,000,000 for the construction of roads and bridges in King Co., is reported favorably voted upon.

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GOOD ROADS

A Weekly Journal of Road and Street Engineering and Contracting

Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, DECEMBER 7, 1912

Number
23

CINCINNATI THE A.R.B.A. CONVENTION CITY



PORTION OF THE CITY OF CINCINNATI, OHIO, LOOKING NORTHEASTERLY FROM COVINGTON, KENTUCKY—CHESAPEAKE AND OHIO RAILROAD AND HIGHWAY BRIDGE OVER THE OHIO IN THE FOREGROUND.

Cincinnati, the "Queen City," chosen by the American Road Builders' Association for its ninth annual convention and the American Good Roads Congress, is situated on the north bank of the Ohio River in Hamilton County in the extreme southwest part of the state of Ohio. It is one of the larger cities of the country and one of the leading ones industrially and commercially.

The geographical location of Cincinnati is unique in many ways. Situated in the southern portion of Ohio, a northern state, and separated by only the Ohio River from Kentucky, a southern state, the city has many of the characteristics of both the north and the south. It is within 15 miles of Indiana, thus making it practically at the intersection of the boundaries of three states. It is something over 100 miles west of the center of population, and within a comparatively short distance from a majority of the larger cities. First-class transportation facilities by both rail and water make it an advantageous distributing point for its own manufactures and the products passing through its markets.

The city is divided east and west by Mill Creek, a stream flowing in a general southerly direction into the Ohio River. The broad valley through which Mill Creek flows and two narrow plateaux or terraces, surrounded by high

hills, form the site of the city. Low water in the Ohio is about 432 ft. above sea level. The stage of the river is subject to great variation, at times rising high above normal, as in February, 1844, when it rose to a height of a little more than 71 ft. above low water. The elevation of the second terrace is about 540, and the hills are from 300 to 350 ft. higher. The valley of Mill Creek has afforded a location for a number of the railroads entering the city and also for the Miami and Erie Canal, which connects Cincinnati with Lake Erie at Toledo. The Ohio water front is about 15 miles in length and is largely utilized, especially by the railroads, for docking purposes.

A little over two miles west of the confluence of Mill Creek and the Ohio River, Licking River, which flows down from the Kentucky mountains in a northwesterly direction, joins the Ohio River on the Kentucky side. It was opposite the mouth of this river that the original settlement of Cincinnati was made in 1788. The settlement was first called Losantiville, but a little later Governor St. Clair changed the name, rechristening the settlement Cincinnati in honor of the patriotic society of that name.

On Dec. 31, 1909, the area of the city of Cincinnati was 49.862 sq. miles, but the annexation of neighboring villages had increased this to 66.35 sq. miles by Dec. 31, 1911. The

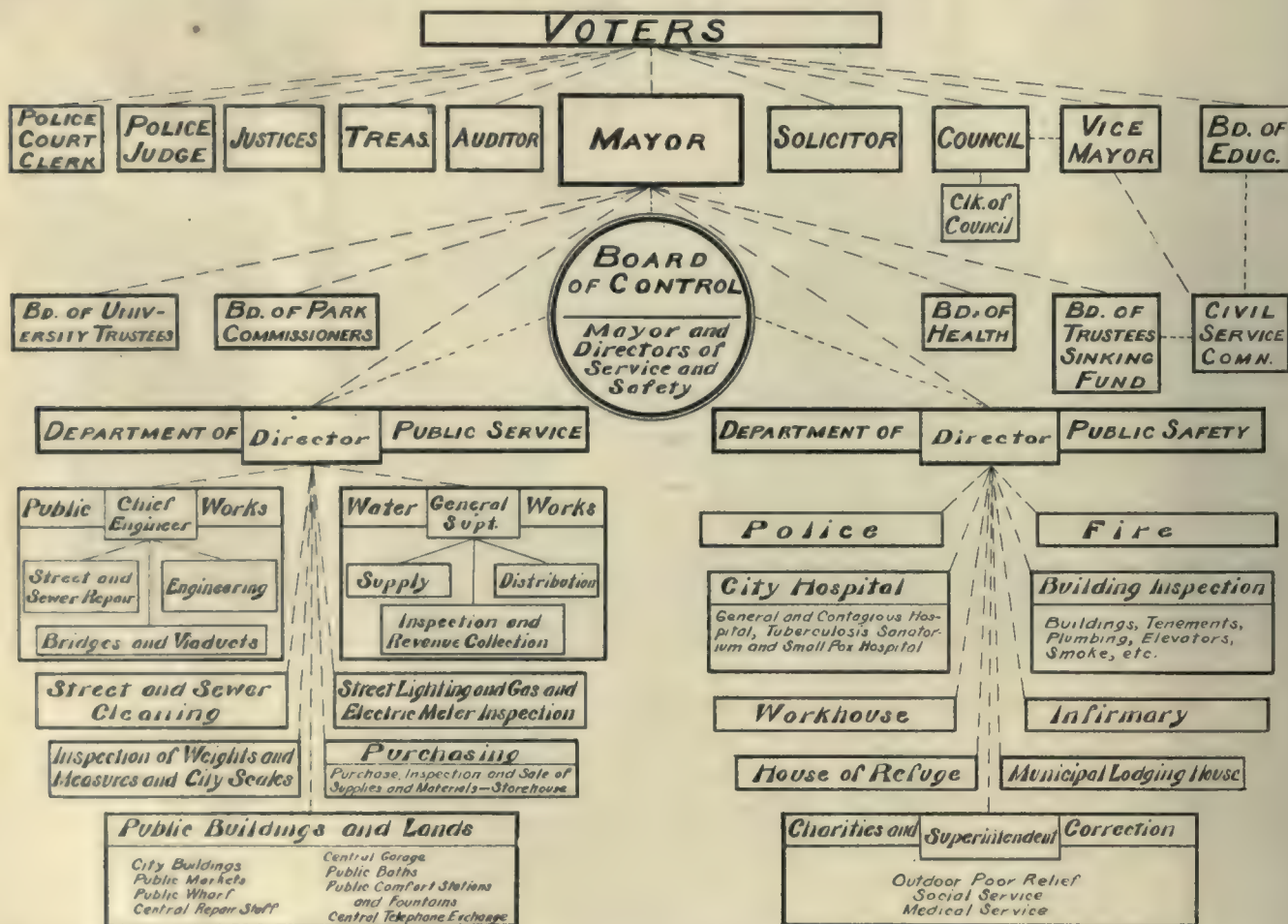
population of the city proper is about 400,000, but this is increased to about 500,000 by including the suburbs, among which are Dayton, Bellevue, Newport, Covington, West Covington, Ludlow and Bromley. Though these are separated from Cincinnati by the Ohio River and situated in the state of Kentucky, they are usually considered to be within what may be termed the metropolitan area.

Radiating from Cincinnati there are 20 railways, of which six—the Big Four Division of the New York Central, the Erie, the Baltimore & Ohio, the Chesapeake & Ohio, the Norfolk & Western and the Pennsylvania—are trunk lines.

One of the twenty railways, the Cincinnati Southern, is owned by the municipality. At one time in the history of the city its trade with the South was threatened by lack of transportation facilities, and, by a popular vote, the citizens authorized the construction by the city of a railroad leading south to Chattanooga. Its cost was met by the

of the world, especially those of the Orient. The Fernbank dam, just below the city, which was completed in 1911, makes a 20-ft. harbor available at Cincinnati during the entire year.

The manufactured products of Cincinnati are many and varied, the city ranking first in the output of a large number of commodities. The total amount of capital invested in manufacturing in the industrial district, which embraces Cincinnati, Covington, Newport, Norwood and various suburbs, was \$170,769,226 in 1905, at which time there were 2,600 factories in the district with an annual output valued at \$203,095,605. These gave employment to 72,735 wage earners, whose annual wages amounted to \$33,932,557, and to 9,825 salaried officials, clerks, etc., whose annual salaries amounted to \$10,929,512. The latest available figures covering this ground—those based on the 1910 census figures for Cincinnati, Covington and Newport; 1905 figures for the remainder of the district, for which 1910



DEPARTMENTAL ORGANIZATION CHART OF THE CITY OF CINCINNATI, OHIO, AS OF FEB. 1, 1912—FROM CHART PREPARED BY THE BUREAU OF MUNICIPAL RESEARCH.

sale of municipal bonds and the road was completed in the early eighties. It is now operated by the Queen & Crescent system under a 65-year lease, and it is stated that it will bring an annual rental during the period of the lease sufficient to pay for its construction and make it a free asset of the city.

In addition to its transportation facilities by rail, Cincinnati is peculiarly favored by its situation on the Ohio, a river carrying a greater tonnage than any other unimproved river. When the locks and dams being built by the government are completed, this advantage will be still more marked, and the opening of the Panama Canal will yet further increase the importance of Cincinnati as a point of water shipment by bringing it nearer many of the seaports

figures are not available; and the estimated growth—are as follows: Capital invested, \$207,411,000; wage earners, 79,501; salaried officials, clerks, etc., 12,741; factory pay rolls (including salaries and wages), \$55,908,421; value of output, \$248,549,634. Besides being a leading manufacturing city, Cincinnati is an important distributing center for a variety of products.

Cincinnati's educational institutions include 3 high schools, 8 special schools, 60 graded schools, 43 kindergartens and 3 night high schools. The municipality also owns the University of Cincinnati, which comprises colleges of liberal arts, engineering, law and pedagogy, and a post-graduate school. An innovation in educational methods has recently been made in this university by the establish-

ment of what are known as cooperative engineering courses. By this plan, 50 employers have arranged with the university to allow students to work one week in the shops and study at the university during the next week, with the idea that at the end of six years the student may be graduated with not only a thorough knowledge of the science of his profession but also a complete mastery of the art. These student apprentices work in pairs exchanging places in the shop and college each week, thereby keeping a constant number in both the school and the shop. Besides the University of Cincinnati, there are in the city 3 theological seminaries, 5 medical colleges, 2 colleges of dental surgery, a college of pharmacy, 2 colleges of music, several dramatic schools and a college of journalism. Training along mechanical lines is provided by the Ohio Mechanical Institute and the Cincinnati Technical Institute.

Cincinnati has 8 national banks and 30 state banks and trust companies, involving a bank capital of \$19,673,400,

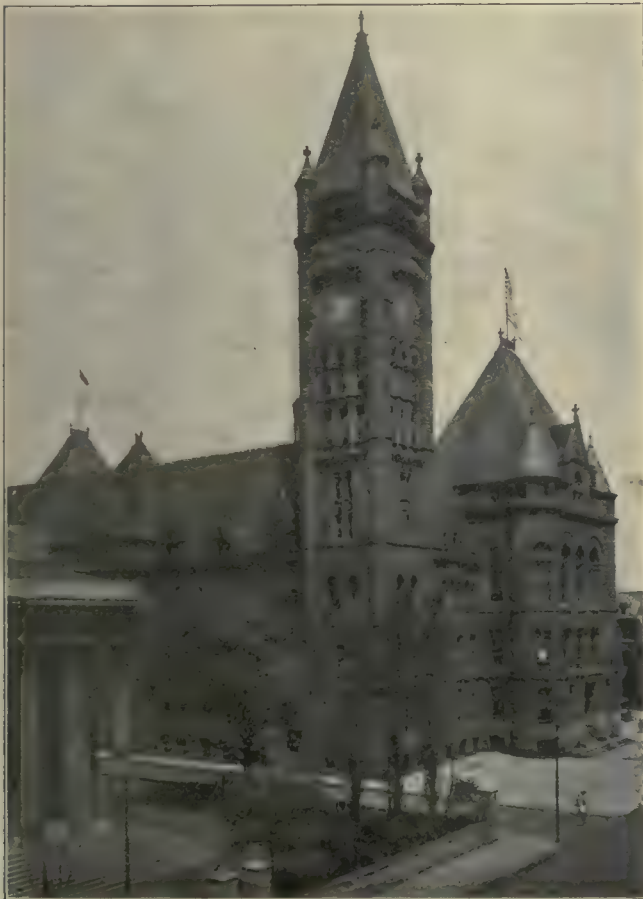


THE TYLER-DAVIDSON FOUNTAIN—FIFTH STREET, BETWEEN VINE AND WALNUT STREETS.

sq. ft. In addition, there are other meeting places for conventions in various hotels.

The organization of the city government is shown by the accompanying chart, which was drawn from chart of the departmental organization of the city of Cincinnati as of Feb. 1, 1912, prepared by the Bureau of Municipal Research. The present administration of the city is a reform administration which came into power on Jan. 1 of this year, as a result of efforts to break the rule of Geo. B. Cox, long known as the "boss" of Cincinnati. The names of the principal officials of the present administration are: Mayor, Henry T. Hunt; Vice Mayor, Simeon Johnson; City Solicitor, Alfred Bettman; Director of Public Service, Victor T. Price; Director of Public Safety, Dennis Cash; City Engineer, Henry M. Waite; Superintendent of Water Works, Bert Baldwin.

The water supply of Cincinnati is secured from the Ohio River, at a point about 7½ miles above Suspension Bridge.



CITY HALL, CINCINNATI, OHIO, CORNER OF EIGHTH AND PLUM STREETS.

bank deposits of \$130,167,021, and resources of \$184,243,857. The bank clearings in 1900 amounted to \$795,593,000 and in 1911 to \$1,277,555,300, an increase of 65 per cent. The post office receipts in 1900 were \$1,291,088 and in 1911 \$2,547,001, an increase of 97 per cent.

Public and semi-public institutions in Cincinnati include about 250 churches; 10 theatres; 20 hotels; a public library, containing 328,000 volumes, and having branches in all of the suburbs, and in addition various other libraries; an art museum, with an art academy in connection; a zoological garden, and various other institutions. The city is particularly well provided with convention facilities by Music Hall, which was built in 1877, by means of donations by Reuben Springer, John Shillito and other citizens. The building contains a hall 125 ft. long, with a seating capacity of 3,600 and a stage 112 ft. wide and 70 ft. deep, and exhibition halls with a total floor space of over 100,000



MUSIC HALL—CONVENTION HEADQUARTERS OF THE AMERICAN ROAD BUILDERS' ASSOCIATION



ROSE HILL AVE., NORTHWEST FROM READING ROAD—
WOOD BLOCK PAVEMENT COMPLETED IN 1905.

The present water works system was commenced in 1907 and turned over to the city water works department, after operation by the commissioners for about a year and a half, in 1909, having cost a little over \$11,000,000. The water is pumped from the river to a filtration plant situated on a hill 145 ft. above low water in the river and from there is carried by gravity to the main pumping station in the city, from which it is distributed.

The total length of sewers in the city on Dec. 31, 1911, was 350.33 miles, of which 273.61 miles were pipe sewers and the remainder, 76.72 miles, were brick and stone. From Jan. 1 to Oct. 1, 1912, a total of 7.3 miles of sewer was completed, bringing the total up to 357.63 miles. During 1911, 4.62 miles of brick sewer and 6.74 miles of pipe sewer were built.

Cincinnati is well supplied with parks, the area having increased from 594 acres in 1910, to 1,543 acres in 1911. The city is engaged in the construction of an extensive system of parks, boulevards and playgrounds, and is adding to the park area each year. Eden Park, one of the largest and most beautiful in the city, contains over 200 acres and is located in Walnut Hills on the top of Mt. Adams and overlooks the Ohio River.

The largest bridges in the city are, of course, those across the Ohio, of which there are five. Only one of these—that carrying the Cincinnati Southern Railway—is owned by the city, and this is leased to the Queen & Crescent system. Of these river bridges, Suspension Bridge is of the most interest, since it was built by John Roebling before the Brooklyn Bridge was built and to some extent served as a model for that structure. The bridge was commenced by Roebling in 1836, but a financial panic the next year, and later the Civil War, delayed its completion until 1867.



WASHINGTON AVE., SOUTH FROM GHOLSON AVE.—
BITULITHIC PAVEMENT COMPLETED IN 1905.

The towers are of stone, 52 by 82 ft. at the base, and rise to a height of 75 ft. above the floor. The roadway which passes through the towers in archways 30 ft. wide, is 91 ft. above low water, at the towers, and 103 ft. at the center. The length of the bridge between towers is 1,057 ft., and the side spans from the abutments to the towers are 281 ft. each, making the total length of the bridge, exclusive of approaches, 1,619 ft. The original bridge had two iron cables $12\frac{1}{2}$ ins. in diameter and a 20-ft. roadway, with two 7-ft. sidewalks. The cost was \$1,828,000. In 1897-8 the bridge was strengthened by the addition of two new steel cables, each $10\frac{1}{2}$ ins. in diameter, placed directly over the old ones. At the same time the roadway was increased to 30 ft. in width and the walks to 9 ft. each. The total cost of its reconstruction was \$650,000. At the time of its construction, this was the longest suspension bridge in existence.

According to the report of the Engineering Department for the year ending Dec. 31, 1910, (the latest figures available), the city owned roadway bridges with a total length of 15,822 ft. and foot bridges with total length of 909 ft. Of the total length of roadway bridges, 13,606 ft. represented the length of iron and steel bridges, 1,724 ft. the length of timber bridges and 492 ft. the length of reinforced concrete bridges. Of the 909 ft. of foot bridges, 113 ft. were of iron and 796 ft. of timber. Of the roadway bridges, 19, ranging from 45 to 81 ft. in span, were over the Miami and Erie Canal; 9, ranging from 92 to 213 ft. in span, were over Mill Creek; 4, ranging from 33 to 51 ft., in span, were over Boldface Creek; 7, ranging from 23 to 120 ft., were over West Fork and Badgely Run, and 8, ranging from 52 to 175 ft., were over the C., C. & St. L. Ry. In addition to these there were between 40 and 50 other roadway bridges and a number of viaducts. Among the latter may be mentioned the 8th Street Viaduct, having a total length of 2,572.7 ft.; the Liberty Street Viaduct, 2,208 ft.; the West Eighth Street Viaduct, 607.42 ft.; the Grandin Road Viaduct, 935 ft., and the Harrison Avenue Viaduct, 1,717.89 ft. Among the longer bridges classed as miscellaneous are an iron bridge, 351 ft. in length, carrying Park Avenue over Kemper Lane, and the Groesbeck Viaduct over Torrence Road, having a length of 615 ft.

The total length of avenues, streets and alleys in the city on Dec. 31, 1911, was 919.9 miles, of which 644.9 were classed as improved. Of the improved streets, 14.49 miles were improved during 1911 and 15.03 were improved during 1910. Table I shows the mileage of pavement of different kinds on Dec. 31, 1910, and on Dec. 31, 1911.

The construction of the various pavements laid in Cincinnati is described briefly in "Paving Report No. 6," entitled "The Selection of Pavements," which was issued by the



SUSPENSION BRIDGE CARRYING SECOND, VINE AND WAL-
NUT STS., CINCINNATI, TO COURT AVE., COVINGTON.

Bureau of Municipal Research in February of this year. The principal pavements laid in the city are built, according to that report, in the following manner:

Macadam, as laid in the city, is uniformly specified to be 12 ins. thick. The locally available road metal is limestone, which, being comparatively soft, is the cause of a considerable amount of dust. Oil is used on some of the old macadamized streets and tar binder has been used in some of the recent construction.

Sheet asphalt is laid 3 ins. thick directly upon a concrete base. The asphalt is laid in two courses, the first a 1-in. binder course consisting of small stone chips and asphalt, and the second, or wearing, course 2 ins. thick consisting of a mixture of sand and asphalt. As usual in this class of construction, both courses are mixed, laid and rolled hot.

Brick pavements, as shown by the table, are used more extensively than any other pavement except macadam. This is probably due to the fact that, Ohio being a center of the manufacture of paving brick, the pavement is one of the cheapest available in the city. Tar has been used almost exclusively for filler in the brick pavements of Cincinnati, although it is noted in the report that the weight of opinion seems to favor Portland cement for this purpose.

Granite pavements in Cincinnati are built of blocks 5 ins. deep laid upon a 2-in. sand cushion resting on a concrete foundation. The specifications call for joints between



URWILER AVE., BETWEEN BOUDINOT AND STATHEN AVES.—BRICK PAVEMENT COMPLETED 1912.

name and consists of graded aggregate cemented together with a bituminous binder, mixed, laid and rolled hot. The wearing surface is laid to a depth of 2 ins. and is placed directly upon a concrete base.

Because of the topographical characteristics of Cincinnati, many of the streets are on rather steep grades which

TABLE I.—MILEAGE OF PAVEMENTS IN CINCINNATI.

Kind of Pavement.	Mileage.			
	December 31, 1910.	December 31, 1911.	Change in 1911.	Increase. Decrease.
Graveled	5.50	5.50	0.00	0.00
Rock asphalt	1.00	1.00	0.00	0.00
Macadamized roads	31.65	79.75	48.10	0.00
Bituminous macadam	7.38	7.38	0.00	0.00
Limestone avenues, streets and alleys	7.85	7.85	0.00	0.00
Asphalt avenues, streets and alleys	39.10	38.00	0.00	0.00
Brick avenues, streets and alleys	75.28	76.68	1.40	0.00
Granite avenues, streets and alleys	63.82	68.82	5.00	0.00
Bowldered avenues, streets and alleys	63.48	63.55	0.07	0.00
Macadamized avenues, streets and alleys	193.34	278.94	85.60	0.00
Bitulithic avenues and streets	5.63	6.79	1.16	0.00
Wood block avenues and streets	7.11	10.55	3.44	0.00
Granitoid avenues and streets	.09	.09	0.00	0.00
Improved avenues, streets and alleys, total	501.25	644.90	144.77	1.10
Unimproved avenues, streets and alleys	270.00	275.00		
Avenues, streets and alleys	771.25	919.90		
Improved during 1910 .....	....	15.03		
Improved during 1911 .....	....	14.49		

bricks not over $\frac{1}{2}$ in. in width when laid and filled with tar and pebbles. Most of the granite used at present comes from quarries in North Carolina and Georgia.

The streets designated as bowldered are paved with bowlders from 4 to 8 ins. long imbedded in gravel. At present, a 6-in. broken stone foundation under the gravel is specified. The total thickness of the pavement, including foundation, has varied during recent years from 14 to 16 ins.

The bitulithic pavement is the standard pavement of that

in many cases have been the controlling factors in the selection of pavements. In the annual report of the Engineering Department for 1906, permissible grades for various kinds of pavements were suggested as follows: Wood block and asphalt, 3 per cent.; brick, $5\frac{1}{2}$ per cent.; granite, 8 per cent.; bowlder, 10 per cent., and macadam, 12 per cent. It is noted in the report of the Bureau of Municipal Research, in which these suggestions are embodied, that the allowable grade for brick may be increased by the use of special



L. & N. R. R. BRIDGE, CARRYING ALSO BUTLER ST., CINCINNATI, TO SARATOGA ST., NEWPORT.



SPRING GROVE AVE., NORTHEAST FROM LINDEN AVE.—GRANITE BLOCK PAVEMENT COMPLETED IN 1911.

hillside blocks and that the allowable grade for bituminous macadam should be put somewhat lower than that given for plain macadam.

In Cincinnati, according to the report of the Bureau of Municipal Research, the direct expenditures for paving amount to over \$1,000,000 per year, and if to this were added the item of interest on capital invested the annual expenses would exceed \$2,000,000. A sound paving policy, as described in the report, requires attention to four main features—proper selection, proper construction, proper repairs, and replacement at the proper time. The first of these, which forms the subject of the report, is discussed at considerable length.

The factors governing the selection of a pavement for any given street, according to the report, are, first, those which may be called general considerations such as smoothness, slipperiness, sanitary qualities, etc., and, second, economy, in which are involved first cost, durability and cost of repairs. The most economical pavement for use under a given set of conditions is that which will show the



WALNUT ST., SOUTH FROM FIFTH ST., CINCINNATI, OHIO.

lowest average annual cost during its life. The average annual cost—defined in the report as “that amount of money which, if contributed annually, will, under the existing conditions, keep the street perpetually paved and repaired”—is made up of three principal factors: (1) average annual cost of repairs, (2) interest on the cost of the pavement, and (3) annual charge on account of sinking fund—i. e., such a fund as set aside and invested each year will suffice to have completely paid for the pavement when the pavement is worn out. The selection of an economical pavement for a given street, taking into account both first cost and average annual cost, requires that certain exact data, especially on the latter, be available. Such data, as is pointed out in the report, are usually meager and fragmentary, but in spite of this, considerable light may be shed upon the problem by the use of even the approximate data available.

The report then goes on to determine the average annual cost of different pavements in Cincinnati by means of such data as are available. The first factor—interest—must, of course, be determined from the average first costs of different kinds of pavement, which for Cincinnati, according to the records of the past four years, are shown in the following table:

Kind of pavement.	Minimum.	Maximum.	Approximate average.
Granite	\$3.25	\$4.69	\$3.70
Wood block	2.60	3.93	3.45
Bitulithic	2.14	3.22	2.65
Asphalt	1.81	2.62	2.30
Brick	1.86	2.50	2.25
Granitoid	1.54	2.50	2.10
Macadam	.66	1.30	.95
Bowler	1.50	2.15	1.75

The remainder of the discussion of these three factors, as presented in the report, is as follows:

The average cost of repairs for individual pavements during their life is not locally available. However, we know the gross amount of money expended annually for several years past on each kind of pavement. From this and such available records as exist of the amount of each kind of pavement in use we can obtain a figure for the average cost of local repairs per square yard per year.

Kind of pavement.	Gross expenditures for repairs.*			Average cost per sq. yd. per year.
	1908.	1909.	1910.	
Asphalt	\$62,994.00	\$46,000.00	\$48,271.44	\$.073
Granite	27,995.00	30,443.00	34,213.00	.026
Brick	14,005.00	22,797.00	10,016.00	.012
Bowler	30,640.00	31,861.04	36,347.12	.033
Macadam	258,930.40	332,511.01	328,232.34	.076

*Cleveland and Columbus, with practically no macadam, spent annually on street repairs during 1908 to 1910, inclusive, an average of \$129,000 and \$39,550, respectively, as compared with Cincinnati's average for the same period of \$441,300.

The gross expenditures in the first three columns are taken from the annual reports of the Street Repair Department. In order to determine the last column, the most recent United States Census Report was used as a basis for the amount of each kind of pavement in use. No allowance is made for streets under guarantee. Particular attention is called to the high repair cost of macadam, especially as compared with brick.

The annual cost of repairs to a Portland cement concrete foundation is assumed to be negligible.

In determining the annual payment on account of the sinking fund, the two factors are the initial cost and the durability or length of life. The former has already been given. For the latter, the figure which is desired for each kind of surfacing should represent the average length of life under the average conditions to which it has been subjected in this city. Obviously this figure is not susceptible of exact determination. We believe, however, that the figures given below are fair approximations.

	Years.
Granite	25
Wood block	(?)
Bitulithic	(?)
Asphalt	15
Brick	15
Bowler	25
Macadam	8*

*We would particularly call attention to the general average life of 8 years assumed for macadam. It is quite impossible to arrive at any accurate general figure for macadam, as the life is so dependent on the amount of traffic, and particularly as the stone locally available is a comparatively soft limestone. We make this assumption merely for the purpose of a definite comparison. The reader, if he desires, can make for himself any other assumption deemed proper, observing that the only item affected is the sinking fund.

The life of the Portland cement concrete foundation is assumed to be 50 years. A variation from this figure of several years will make no material difference.

With the foregoing data as a basis, the annual amount of money required for the sinking fund is readily calculated by the use of standard tables.

The foregoing is summarized in the report in Table II.

It is pointed out in the report that this table shows that the respective costs of granite, asphalt and macadam, laid under the actual conditions that have obtained in Cincinnati, are not far apart, while the cost of brick pavement is considerably lower. Bowler is not considered, being regarded as obsolete. It is also pointed out that the lack of data on the life and cost of repairs on wood block and bitulithic pavement makes figures for those items uncertain.



PARK AVENUE BRIDGE, CINCINNATI, OHIO.

The most significant facts brought out by the figures in the table are, according to the report, the relatively high cost

Cincinnati. Cleveland. Toledo. Columbus.

Stone Block	14.2	36.4	14.0	7.4
Wood Block .....	.....	0.4	4.2	.....
Brick	14.0	55.1	55.8	67.0
Asphalt or Asphalt Block	8.6	7.5	15.0	18.4
Boulder	12.0	.....	1.5	1.8
Macadam	48.4	0.4	8.3	5.4
Bituminous Macadam .....	.....	0.2	1.2	.....
Gravel	1.1	.....	.....	.....
All others	1.7	.....	.....	.....

This table shows, the report states, that Cincinnati has overwhelmingly favored macadam—one of the most expensive pavements—and has failed to utilize to the best advantage brick, which is one of the cheapest. In the other cities the reverse is true, it is stated. Had it been used in Cincinnati, on, say, half of the area now improved with macadam, the city would be saving over \$100,000 per year, as well as reaping many other advantages, according to the report. The tendency in the selection of pavements in Cincinnati during the period extending from the beginning of 1908 to Aug. 25, 1911, is shown in Tables III and IV, taken from the report.

TABLE II.—COST DATA ON PAVEMENTS IN CINCINNATI.

Underlying Data.	Granite.	Wood block	Bit	Asphalt.	Brick.	Boulder.	Macad.
First cost of surfacing	\$2.70	\$2.45	\$1.65	\$1.30	\$1.25	\$1.75	\$0.95
Assumed life	25 yrs.	(?)	(?)	15 yrs.	15 yrs.	25 yrs.	8 yrs.
Average Annual Cost of Surfacing:							
Interest at 4 per cent. on cost of surfacing	0.108	0.098	0.066	0.052	0.050	0.070	0.038
Average annual cost of repairs	0.026	(?)	(?)	0.073	0.012	0.033	0.076
Annual charge for sinking fund	0.063	(?)	(?)	0.063	0.060	0.041	0.100
Oiling or watering .....	.....	.....	.....	.....	.....	.....	0.040
Total, surfacing	0.197	.....	.....	0.188	0.122	.....	.....
Average annual cost of foundation	0.046	0.046	0.046	0.046	0.046	.....	.....
Total average annual cost per sq. yd.	0.243	(?)	(?)	0.234	0.168	0.144	0.254

of macadam and the relatively low cost of brick, the former being nearly 50 per cent. greater than the latter. It is pointed out, furthermore, that in comparing the annual costs given it must be remembered that the different kinds of pavements are not generally subjected to the same traffic conditions, macadam being normally used on streets of light traffic and yet costing about the same as granite which is used on streets carrying the heaviest traffic. Therefore, if the macadam were to be replaced with a more permanent pavement the comparative costliness of the former would be even more marked.

The report then takes up the relative proportions of different kinds of pavements in use in Cincinnati, and also, for the sake of comparison, in three other large cities in Ohio. The percentage of each kind of pavement to the total paved area in these four cities, in 1907, is shown in the following table:

TABLE III.—AREA IN SQUARE YARDS OF PAVEMENT CONTRACTED FOR, 1908 TO AUGUST, 1911.

	1908.	1909.	1910.	1911 to August 25.
Granite	49,223	160,834	149,173	49,520
Wood Block	100,985	48,537	81,870	23,390
Bitulithic .....	.....	.....	31,000	2,100
Asphalt	18,870*	10,765	10,205	1,220
Brick	30,477	75,665	20,693	22,082
Granitoid .....	.....	.....	1,775	.....
Macadam	41,460	35,270	26,876	25,091
Boulder	5,795	7,343	700	.....

*Also resurfacing 90,736 yards.
†Also 50,000 yards enjoined.

TABLE IV.—PERCENTAGE OF EACH KIND OF PAVEMENT CONTRACTED FOR, 1908 TO AUGUST, 1911.

Granite	39.7 per cent.
Wood Block	24.7 per cent.
Bitulithic	3.2 per cent.
Asphalt	4.0 per cent.
Brick	14.5 per cent.
Granitoid	 per cent.
Macadam	12.5 per cent.
Boulder	1.4 per cent.

The report also states that while the paving work done recently has included a smaller proportion of macadam than formerly, expensive pavements are still used.

According to reports, the usual flood of bills for the construction of long, expensive trunk highways at federal expense is being prepared in anticipation of the opening of Congress. One of these, it is said, contemplates the establishment of a system of roads connecting the capital of every state in the Union with the national capital. These roads are to cost \$20,000 per mile and have a total length of some 15,000 miles. The author of the scheme proposes that the necessary funds be provided by increasing the tax on tobacco. The amount it would be necessary to add to the present very small tax, he claims, would not impose a burden upon either the grower, the manufacturer or the consumer, and would suffice to pay for the roads in about four years.



OBSERVATORY AVE., WEST FROM DELTA AVE.—BITUMINOUS MACADAM COMPLETED IN 1905.

Road Building in Ohio

Road building, other than the construction of local roads, may be said to have had its beginning in Ohio with the commencement of work on the Ohio section of the Cumberland or Old National road in 1825. In 1904, seventy-nine years later, systematic road building by an organized state department was inaugurated by the enactment of legislation providing for the establishment of a state highway department.

Ohio's geographical position, between Lake Erie on the north and the Ohio River and the mountains of Kentucky on the south, makes it the great natural transportation valley between the East and the West. Early in the country's history the westward movement of settlers made roads across the state necessary and the Federal Government undertook the work. By the provisions of the laws enacted by Congress in 1802 for the admission of Ohio as



CLIFFORD SHOEMAKER.
Deputy in Charge of
Construction.



JAMES R. MARKER.
State Highway Commissioner.



JNO. R. CHAMBERLIN.
Deputy in Charge of Bridges.



A. H. HINKLE.
Deputy in Charge of
Maintenance.



J. H. TILTON.
Chief Clerk.

Principal Officials of the OHIO State Highway Department

The state of Ohio has an area of a little over 41,000 square miles, an extreme breadth (east to west) of about 230 miles and an extreme length (north to south) of about 205 miles. According to the last census, it had a population of approximately four and three-quarter millions, ranking fourth among the states of the country in that respect. It was the fourth state admitted to the Union, the date being Feb. 19, 1803. It contains seven of the 100 largest cities of the country, including one—Cleveland—of the eight cities having over 500,000 inhabitants. Cincinnati, the next largest city in the state, has a population nearly as large as Cleveland when the various cities near it—and which are to all intents and purposes parts of it—are included.

a state, and by subsequent legislation in 1803 after it had been formally admitted, 2 per cent. of the proceeds of the sale of public lands within the state was designated for use in the construction of a road from navigable water on the Atlantic Coast to the Ohio River and 3 per cent. was set aside for expenditure in laying out and building roads within the state. The former fund was used for the construction of the Cumberland Road, previously referred to, and the 3 per cent fund was expended for intra-state roads under the direction of the state Legislature.

The Cumberland Road was originally designed to extend from Cumberland, Md., to St. Louis, passing through Washington, Pa.; Wheeling, W. Va.; Columbus and Springfield, Ohio; Richmond, Indianapolis and Terre Haute, Ind.,



LAYING CONCRETE PAVEMENT—EXPERIMENTAL ROAD ON CHILLICOTHE PIKE NEAR COLUMBUS, OHIO.



LAYING BRICK ON BRICK PAVED SECTION—CHILLICOTHE PIKE EXPERIMENTAL ROAD.

and Vandalia, Ill. A part of the western end, however, was never completed, the commencement of railroad building having caused the abandonment of the enterprise. The original laws authorizing the construction of the road placed the preparation of detailed plans in the hands of a congressional committee. This committee reported back to Congress in December, 1805, and in 1806 a law providing for the construction of the road under the direction of the President and appropriating \$30,000 for the work was signed by President Jefferson. A committee of three was appointed to have direct charge of the work, and, in December, 1806, this committee reported on the route from Cumberland, Md., to Wheeling, W. Va. After surveys had been made and rights of way obtained, the first contracts were let in April, 1811, and were followed by others in subsequent years. By 1818, regular coach service was in operation between Washington and Wheeling.

Actual work on the Ohio portion of the road began two years later, when, in 1820, Congress appropriated \$10,000 for the laying out of the road between Wheeling and the Mississippi River. The question of constitutionality came up and was discussed at considerable length, but early in 1825 Congress appropriated \$150,000 to build the road from Wheeling, W. Va., to Zanesville, Ohio, and for the continuation of surveys through Ohio, Indiana and Illinois. In 1826, an appropriation of \$110,749 was made for the military service, which appears to have been a deficiency appropriation to pay for work on the Cumberland Road during 1825. In 1827, \$170,000 was appropriated for the

construction between Canton and Zanesville and for the continuation of surveys; in 1828, an appropriation of \$175,000 was made for the completion of the road to Zanesville; in 1829, 1830, 1831 and 1832, four appropriations of \$100,000 each were made for the continuation of the road west of Zanesville; in 1833, \$130,000 was appropriated for the "road west of Zanesville"; in 1834, 1835 and 1836, three appropriations of \$200,000 each were made for "continuing the road in Ohio"; in 1837, \$190,000 was appropriated for the same purpose, and in 1838, \$150,000.

Actual work on the road between Wheeling and Zanesville began in 1825, and bids for the construction of the road from Zanesville to Columbus were received in June, 1829. This section was completed in 1833, opening up direct communication between Columbus and Cumberland. The average cost per mile in Eastern Ohio was about \$3,400—considerably less than the cost of the section east of the Ohio River, where the average cost had been about \$13,000 a mile, including heavy grading and stone bridges. Contracts for the work on the road west of Columbus were let in 1830, and work was carried on in Madison, Clark, Montgomery and Preble counties during the following seven years.

By 1822, traffic had become so heavy on the road that the question of repair had become a serious one, and laws passed by Congress providing for collecting tolls having been decided unconstitutional, the desired end was accomplished by delegating that duty to the several states whose power to do so was unquestioned. In Ohio and in



SPREADING TARVIA AND SAND—BITUMINATED CONCRETE SECTION—CHILLICOTHE PIKE EXPERIMENTAL ROAD.



POURING ASPHALT ON PETRIFALT SECTION—CHILLICOTHE PIKE EXPERIMENTAL ROAD.

Pennsylvania, the surrender of the completed portions of the road commenced in 1831 and continued. In 1831, a law was passed in Ohio providing for the establishment of a toll gate every 20 miles and for the repair of the road by state officials. Five years later, in 1836, a board of public works was created in Ohio and the administration of the road placed in its charge. In 1850, the practice of leasing portions of the road to private companies began in Ohio, and four years later the entire section from Springfield to the Ohio River was leased for \$6,105 a year. This lease was to run for 10 years but was surrendered before half the time had passed. In 1870, sections of the road were placed under the control of the county commissioners, with the stipulation that toll gates should not be less than 10 miles apart. In 1877, further legislation placed the determination of toll rates in the hands of the county commissioners and also gave those officials in counties of more than 15,600 population authority to submit the question of declaring the roads free to popular vote.

The total cost of the Cumberland Road, so far as built, was approximately \$7,000,000, and during the latter half of the nineteenth century the road played a very important part in developing the country through which it passed. Some idea of its importance may be obtained from the

Besides these roads, the early roads of Ohio included many toll roads, the first turnpike company having been incorporated in 1809. The state laws permitted both the state and the counties to subscribe to the stock of these companies, and by the year 1848 the state's subscriptions amounted to about \$2,000,000, while the total amount subscribed by the counties in the same period was without doubt a great deal more. The system gradually died out as the roads became unprofitable, and the roads were taken over by the counties in which they were situated.

In 1865, the Legislature passed a law permitting county commissioners to acquire and improve roads. This law was followed by a great mass of road legislation which continued until very recently. The intent of all of these laws has been to provide authority for the improvement of roads and to make provisions for apportioning the expense, and under them about two-thirds of the counties in the state have done construction work ranging from the building of a few miles to several hundred miles of road, the total amount, according to the 1909 report of James C. Wonders, at that time State Highway Commissioner, being probably more than 20,000 miles.

In April, 1904, the Ohio Legislature enacted a law creating a state highway department and appropriating \$10,000



A SECTION OF THE CANAL ROAD IN CUYAHOGA COUNTY, OHIO—A TYPICAL BRICK PAVED OHIO ROAD.

records of toll collected, which is said to have amounted to \$50,000 in the year of 1838 in Ohio alone; although at that time the road had not been completed west of Springfield. The tolls for the next year are said to have been even greater, \$62,446.10 having been collected, while the total amount collected in Ohio between 1831 and 1837 has been placed at nearly \$1,250,000.

Previous to 1825, when the construction of the Cumberland road was undertaken, various roads had been built in Ohio by the 3 per cent fund, of which a total of \$350,000 had been paid over to the state. As the disposition of this money was entirely in the hands of the Legislature, bills providing for the construction of roads were among the important acts of the early legislative history of the state. It is said that from the beginning the distribution of this fund was a source of contention between the upper and lower houses and an occasion for "log rolling" among the members. Few of the bills became laws, it is said, until after a conference between the two houses and the adjustment of various claims and the satisfying of divers interests. Each section of the state naturally wanted a road built by this fund, and its representative quite as naturally worked to secure it since his reelection depended largely upon the success of his efforts.

for state aid. This law placed the appointment of the Highway Commissioner in the hands of the Governor, and Sam Huston was appointed State Highway Commissioner for a term of four years. He entered upon his duties on July 1, 1904, and resigned early in 1908 on account of ill health, which resulted in his death on June 9 of the same year. He was succeeded by James C. Wonders, who occupied the position until the present highway law was passed.

The present officials of the State Highway Department are as follows: State Highway Commissioner, James R. Marker; Deputies: Clifford Shoemaker, construction; Jno. R. Chamberlin, bridges; A. H. Hinkle, maintenance; Chief Clerk, J. H. Tilton; Division Engineers: D. W. Seitz, Harwood Lersch, J. R. Burke, John R. Moore, Jr., Nicholas Koehler, Arch W. Smith and H. D. Bruning.

When the Highway Department was created in 1904, those counties which had improved their roads were generally opposed to the state aid principle, their attitude being that having built and paid for their own roads it was unfair that they be called upon to assist counties in which such work had not been done. In the highway act, therefore, there was conceded to such counties as had constructed or improved roads previous to the creation of the



HIGHWAY NEAR WESTERVILLE, FRANKLIN COUNTY, OHIO—TAR BOUND MACADAM.

department the privilege of taking their apportionments of the state aid fund and expending them under the local authorities in the repair of the roads already built.

In describing the situation in Ohio in 1910, in an address at the seventh annual convention of the American Road Builders' Association at Indianapolis, Ind., in December of that year, Mr. Wonders said that much of the road legislation on the statute books of the state had been passed to meet the real or fancied needs of some particular community without any regard to the effect upon other parts of the state, with the result that where there should be a simple and easily understood plan of uniform application throughout the state there was actually an accumulation of acts containing very little referring to the methods of construction, the principal object of each being to provide a different plan for distributing the cost of the improvement.

The multiplicity of road laws finally led to the passage of a bill by the Legislature directing the preparation of recommendations for a new law to replace the existing legislation. The State Highway Commissioner was charged with this duty and in submitting recommendations to Governor Harmon in January of last year, Mr. Wonders again called attention to the many laws on the statute books.

"The present road laws of Ohio are comprised in 756 sections, under Title 4 of Part Second of the General Code," he said. "Fifteen plans are provided in this law for the construction of roads by county commissioners, and for



HAMILTON-GREGORY ROAD, BUTLER COUNTY, OHIO—WATER BOUND MACADAM.

assessing the costs of the same; four plans provide for construction by township trustees; there is one plan which provides for construction by county commissioners and township trustees acting jointly, and another plan provides for road districts comprised of one or more townships, in which the work of construction is under the charge of road commissioners selected by the townships, making a total of twenty-one different plans providing for the construction of roads."

As a result of the investigation of the laws and their application, a new law, designated as Senate Bill 165 and known as the "McGuire Bill," was passed by the Legislature and approved by Governor Harmon on June 9, 1911. This law, which repealed practically all of the previous highway laws and materially changed the organization and conduct of the State Highway Department, has been given in considerable detail in previous numbers of "Good Roads."

Under the terms of the law the principal officers of the State Highway Commission are a state highway commissioner, who is appointed by the governor with the advice and consent of the Senate; three deputies, appointed by the state highway commissioner, with the advice and consent of the governor—one deputy having charge, under the highway commissioner, of road construction, another of road maintenance and the other of bridge work; a chief clerk,



ATHENS EXPERIMENTAL EARTH ROAD AFTER IMPROVEMENT BY STATE HIGHWAY DEPARTMENT.

and eight division engineers—four in the Bureau of Construction, two in the Bureau of Maintenance and Repair and two in the Bureau of Bridges.

The law provides three methods for securing state aid for road improvements. By the first the initiative lies with the owners of at least 51 per cent. of the lineal feet of abutting property; by the second it lies with the county commissioners without reference to the landowners, and by the third township trustees deal directly with the State Highway Commissioner without regard to either property owners or the county commissioners.

In all cases the approval of the State Highway Commissioner must be secured before work can be undertaken. Final plans, specifications and estimates are also prepared by the State Highway Department, and contracts are awarded by the state.

For all work done by state aid, the state bears 50 per cent. of the cost up to the limit of twice the county's apportionment. The remaining 50 per cent. is paid by the county, township or townships and property owners; by the county alone; by the township or townships and the property owners, or by the township or townships alone.

The state's proportion of the cost is provided from

specific appropriations and from automobile registration fees, and is divided equally among the counties. County and township funds may be raised by direct tax levies or by the issuing of bonds.

According to the highway law, those highways improved or constructed by state aid must be kept in repair and maintained by the State Highway Commissioner, the expense of such work to be borne by the state, the county and the townships in the proportions of 25 per cent., 50 per cent. and 25 per cent., respectively. It is provided that the state's share shall be payable from moneys appropriated by the General Assembly for the purpose, and the counties' and townships' shares from their respective road or road repair funds. The Commissioner is also empowered to make contracts with individuals, firms or corporations or with the county commissioners or township trustees to repair and maintain such highways under the direction of the State Highway Commissioner, or to furnish the labor for such repair and maintenance. The State Highway Commissioner is also empowered to furnish the material or labor, or both, and directly supervise the work. In the same section, it is provided that intercounty highways on which any state aid money has been expended or which have been improved in a manner equal to that specified by the State Highway Department for the particular material used in the construction may be taken over by the state upon application of county commissioners, after which they must be maintained as state highways. County and state roads not taken over by the state must be maintained by the county, and township roads by the townships.

State Highway Commissioner Marker, in an address before the County Commissioners' Association of Ohio some time since, pointed out that in a part of the appropriation bill which refers to state aid in road building there is a paragraph which provides that the appropriation made shall not be paid out by the State Highway Department for any purpose other than new construction in counties having less than 200 miles of macadam, gravel or brick road; that no part of the appropriation shall be paid by any county for repairs on dirt or unimproved roads, but in any counties having more than 200 miles of macadam, gravel or brick roads it may be used for new construction or for the improvement of the roads as the county commissioners may decide. Commissioners Marker also pointed out that the section of the General Code also provides that revenues derived from registration fees as provided for in that portion of the law shall be apportioned in the same manner as the state highway fund is apportioned. From these two laws, according to Commissioner Marker, it must be concluded that neither the money appropriated for state aid nor the revenue from registration fees can be used in the maintenance or repair of non-state highways in counties in which there are less than 200 miles of macadam, gravel or brick roads. Since the latest statistics available showed at that time that 43 of the 48 counties of the state had less than that amount of macadam, gravel or brick roads, he pointed out that in practically one-half of the counties the state could not expend money for maintenance and repair, and stated that this situation was not brought about intentionally, the object of the restricting clause being to prevent money from being used inefficiently for temporary improvements in counties having few or no improved roads, and recommended that the law be corrected by the next Legislature. Under these conditions, he stated that it was the intention of the department to investigate the roads constructed by state aid in counties having less than the required mileage of the specified kind of road, prepare specifications for their maintenance and repair, and advise with the county commissioners regarding the work, with the end in view that the counties finance it all until the existing defects in the law could be remedied.

From the passage of the state aid law in 1904, which carried an appropriation of \$10,000, the appropriations for state aid have been as follows: 1905, \$10,000; 1906, \$150,000; 1907, \$150,000; 1908, \$440,000; 1909, \$486,577.75, and 1910, \$558,654.32. Under the provisions of the original highway law the money was divided equally among the counties, and in 1908 the law was amended so that the apportionments of counties not applying for state aid could be divided among those which did apply. The expenditures of state aid for pike repairs and other new construction from 1905 to 1910, inclusive, have been as follows: Pike repairs, \$227.26 in 1905, \$54,545.28 in 1906, \$56,249.82 in 1907, \$230,000 in 1908, \$282,517.44 in 1909 and \$256,850.70 in 1910; for new construction, \$233.09 in 1905, nothing in 1906, \$53,815.12 in 1907, \$30,394.54 in 1908, \$115,406.94 in 1909 and \$205,941.80 in 1910.

The amount of work done under state aid in Ohio in 1911 included the construction of 168,273.6 lin. ft. of water bound macadam road, at a total cost of \$197,227; 55,444 lin. ft. of macadam with bituminous binder, at a cost of \$71,060; 18,268.8 lin. ft. of gravel road, at a cost of \$11,062; 6,916.8 lin. ft. of telford road, at a cost of \$9,869; 60,931.2 lin. ft. of brick road, at a cost of \$151,000, and 11,932.8 lin. ft. of earth road, at a cost of \$6,770. There was also at the end of the year some concrete road under construction. The total expenditure for the year was \$509,221.54. Roads contracted for during the present year to Oct. 1 included 28 miles of brick, 34 miles of concrete, 8 miles of bituminous macadam, 50 miles of water bound macadam and 7 miles of gravel, at a total contract price of \$1,112,060.

The present total road mileage of Ohio is 89,000 miles in round numbers, this including only the roads outside of the corporate limits of cities. Of this total, 25,000 miles are classed as improved highways and include 14,500 miles of gravel road, 10,000 miles of macadam and stone roads and 500 miles of brick and concrete road. The remaining mileage, 64,000 miles, consists of earth road.

Two experimental roads have been constructed by the State Highway Department and a third is now under construction. The first of these was built in 1909 on a road known as Nelson Avenue, near the city of Columbus, the cost being met by an appropriation of \$10,000 previously made by the Legislature. Seventeen sections, each about 400 ft. in length, were put down, various manufacturers of road material participating in the work by furnishing the material and sending an expert to supervise the construction. This work was described in detail in Bulletin No. 12 of the Highway Department, issued in January, 1910, and supplemental reports were made in Bulletins Nos. 13 and 15, issued in September, 1910 and November, 1911, respectively.

The work in Darke County consisted of experiments in binding gravel and crushed stone with tar and asphalt and in constructing a water bound macadam roadway of both crushed bowlders and washed gravel, using clay and lime-stone screenings for binder. In all, six sections were laid, the work being done during the summer of 1910. A detailed description of this was given in Bulletin No. 13 and a supplemental report on the work appeared in Bulletin No. 15.

At present, the department is constructing another experimental road on what is known as the Columbus and Chillicothe Pike, near Columbus. This work is being paid for out of an appropriation of \$3,000 granted by the Legislature, manufacturers supplying the material free or at nominal prices. Besides sections paved with macadam of various types, there will be sections of brick pavement and of concrete pavement. The brick sections will be laid with different kinds of brick and fillers of various kinds will be used. The concrete sections will consist of plain concrete and concrete surfaced with bituminous material.

Road Work in Hamilton County, Ohio

Hamilton County, Ohio, of which Cincinnati—the convention city—is the county seat, is the extreme southwestern county of the state. It has an area of 406 square miles, is between 25 and 30 miles wide (east and west) and varies in width (north and south) from about 12 miles in the narrowest place to about 19 in the widest. It is bounded on the north by Butler and Warren Counties, on the east by Warren and Clermont Counties, on the south by the

ing Nov. 15, 1910. Of this mileage, 324 miles are classed as improved, and all the improved roads are macadam, according to the report previously mentioned. The cost of county road work is paid by funds obtained from direct tax levies, and there are no bonds outstanding against the county.

The Board of County Commissioners consists of Stanley Strubel, President; W. P. Scully and H. H. Lippelmann.



STEEL HIGHWAY BRIDGE NEAR ELIZABETHTOWN,
HAMILTON COUNTY, OHIO.

Ohio River, which separates it from Campbell, Kenton and Boone Counties in Kentucky, and on the west by the state of Indiana. Its population, according to the 1910 census, was 460,732.

The total road mileage of the county is 936 miles, according to the latest figures available—those in the annual report of the State Highway Department for the year end-



CONCRETE ARCH CULVERT NEAR ADDYSTON,
HAMILTON COUNTY, OHIO.

Clinton Cowen is County Engineer and Surveyor. The offices of the county officials are at the Court House in the city of Cincinnati.

Data on the amount of state aid expended for pike repairs, from the creation of the State Highway Department to Nov. 15, 1910, (the latest date for which information is available), show the expenditures in Hamilton County



TWO-SPAN CONCRETE HIGHWAY BRIDGE ON THE MONTGOMERY PIKE IN HAMILTON COUNTY, OHIO.



VIEW OF A PORTION OF THE MONTGOMERY PIKE IN HAMILTON COUNTY, OHIO—ONE OF THE IMPROVED ROADS OF THE COUNTY.

to have been \$1,704.54 in 1906, \$1,704.54 in 1907, \$5,000 in 1908, and \$5,586.76 in 1909. Practically no state aid money was expended for new construction in that county during the period, the first contract for state road construction in the county having been awarded on Oct. 4, 1910. This was for building 2.9 miles of water bound macadam on the Lawrenceburg and Harrison Road in Whitewater Township. The work involved the construction of a 24-ft. road with a 6-in. macadam surface, 16 ft. in width, and effected a reduction in the maximum grade from 7 per cent. to 4.7 per cent. The contract price was \$18,585.

Most of the county road work has consisted of the reconstruction of old roads, the condition of the road, as a rule, determining the character and extent of the improvements to be made. Where the old material can be

utilized, it is spiked up and shaped and new material added in either one or two courses, depending upon the depth of the old material left on the road. It is stated that the policy has been to allow a new road to go without repair for two years and then expend about 25 per cent. of its original cost in its general repair. Bituminous material has been used successfully on a number of roads, and it is the belief of the county officials that a macadam highway, subjected to more than an ordinary amount of traffic, should receive some such treatment as this if possible. Oil has also been used to considerable extent for dust laying. It has been found that the cost of maintaining the macadam roads of the county is a very important item of expenditure, an annual outlay of from 12 to 15 per cent. of the original cost being necessary to keep such a road in good condition.



VIEW OF ANOTHER SECTION OF THE ROAD SHOWN IN THE ILLUSTRATION AT THE TOP OF THE PAGE—MONTGOMERY PIKE.



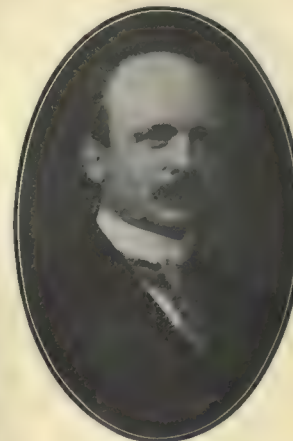
NELSON P. LEWIS,
President.



HAROLD D. PARKER,
First Vice President.



J. D. MERIWETHER,
Second Vice President.



W. A. McLEAN,
Third Vice President.



E. L. POWERS,
Secretary.

Executive Officers
of the

American Road Builders' Association.



W. W. CROSBY,
Treasurer.

The American Road Builders' Association, Its History, Organization, Membership, Aims and Purposes.

The American Road Builders' Association, which holds its ninth annual convention at Cincinnati, Ohio, during the present week, is an organization consisting, mainly, of road and street officials, engineers and contractors, and road building equipment and material manufacturers and dealers. It also includes in its membership many not actively engaged in road building but nevertheless interested in it and, in many cases, indirectly identified with it.

Ten years ago a small group of men, most of them the highway officials of the few states that at that time had well organized highway departments, met in New York City and formed an organization which they called the American Road Makers' Association. The first convention was held in Detroit, Mich., on Feb. 13 and 14, 1903. At that time, practically all of the members of the organization were busily engaged in experimenting with various materials and methods of construction, and the benefits which they secured from getting together and exchanging experiences and ideas proved to them the value of such gatherings and resulted in the decision to hold annual meetings.

Pursuant to this decision, a second convention was held at Hartford, Conn., on Feb. 10 and 11, 1904, at which

1,129 delegates were in attendance. The success of this meeting led the officials of the association to add one day to the convention the next year, which was held at Port Huron, Mich., on Aug. 29, 30 and 31, 1905. The fourth annual convention was held at Pittsburgh, Pa., on March 12, 13 and 14, 1907, and was attended by 1,245 delegates from 28 different states, and the fifth convention was held at Buffalo, N. Y., on July 7 and 8, 1908.

The sixth annual convention, which was held at Columbus, Ohio, on Oct. 26, 27, 28 and 29, 1909, marked two innovations—the first, the lengthening of the meeting to four days and, the second, the holding of an exhibition of road machinery and materials in conjunction with the meeting. Over 1,000 delegates registered during the convention, and great interest was manifested in the exhibition by both exhibitors and delegates.

By 1910 conditions in the field of road and street construction and maintenance had become quite different from those obtaining when the association was organized six years before. The general public had come to a greater realization of the importance of highway improvement and the awakened public opinion had effected the establishment of state highway departments and the adoption of the state aid principle in many of the states; by giving



JAMES H. MACDONALD.



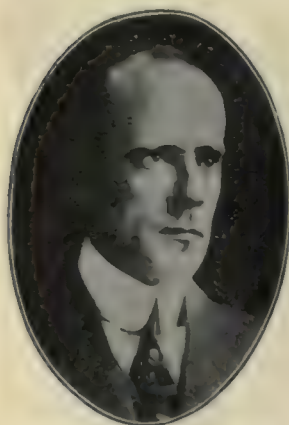
AUSTIN B. FLETCHER.



R. A. MEEKER.



JOHN R. RABLIN.



LOGAN WALLER PAGE.



WM. H. CONNELL.



F. E. ELLIS.



FRANK D. LYON.



ARTHUR H. BLANCHARD



A. N. JOHNSON.



A. W. DEAN.



CLIFFORD RICHARDSON.



S. D. FOSTER.



CHARLES P. PRICE.



P. L. HARDISON.



CHARLES HENRY DAVIS.

DIRECTORS OF THE AMERICAN ROAD BUILDERS' ASSOCIATION.

more earnest attention to the problems arising in connection with the work, engineers had materially advanced the science and art of road building, and prominent men in various walks of life had devoted both time and money to the furtherance of highway betterment. As a natural accompaniment to this development, the membership of the American Road Makers' Association increased, the scope of its activities was enlarged, its influence grew greater and its annual convention became the principal event of the year in road building circles. During the year the name was changed to the American Road Builders' Association and the organization was chartered, without capital, under the laws of the state of New York.

Its seventh meeting was held at Indianapolis, Ind., on Dec. 6, 7, 8 and 9, 1910. Over 1,400 delegates registered during the four days of the convention, most of them being state, county and township highway officials and engineers, and road building and paving contractors, representing about forty states. In conjunction with the convention, there was held a second exhibition of road building equipment and material. The exhibits were many and varied and attracted large numbers of visitors on all four days of the meeting, and so great was the satisfaction expressed by both exhibitors and visitors that it was practically decided to make the exhibition a permanent feature of the meetings of the association.

The eighth annual convention of the association, and the third exhibition of machinery and materials, were held at Rochester, N. Y., on Nov. 14, 15, 16 and 17, 1911. At this meeting the registered attendance was 1,461, nearly half of whom registered before the end of the first day. Something of a departure was made in the method of conducting the proceedings, each session being devoted to the consideration of a special topic introduced in a formal paper which was followed by two formal discussions and then by general discussion. The displays of road building machinery and materials at Rochester formed the most complete and varied exhibition of its kind ever held. It was participated in by 55 exhibitors and included a great number and variety of machines and materials.

The lighter exhibits were displayed in the building used for the sessions of the convention, while most of the heavy machinery was accommodated outside of the building.

The American Association for Highway Improvement held its first annual convention at Richmond, Va., on November 20, 21, 22 and 23, 1911. During that meeting tentative plans were made for a road congress under the joint auspices of the American Road Builders' Association, the American Association for Highway Improvement, the American Automobile Association and the National Association of Road Machinery and Material Manufacturers, the latter being an organization of the manufacturers of road machinery and materials, which

had been formed at the Richmond meeting. At first it was thought that this plan might be feasible and that the holding of such a meeting might result in some good by replacing several separate meetings having somewhat similar objects by one joint meeting at which the various interests represented could be combined. A committee consisting of two members from each of the four associations was appointed to formulate plans, but was soon replaced by another committee, known as the Committee of Twelve, consisting of three members from each of the associations. This committee, on Feb. 17, 1912, appointed an executive committee of four—one representative from each of the four organizations—and gave that committee full power to make and execute plans for the congress. Friction developed in this executive committee and the directors of the American Road Builders' Association after several meetings and full discussion, concluded on May

10, to withdraw from further participation in the joint road congress. This step was taken in the belief that the conditions existing in the executive committee made the success of the proposed joint meeting improbable, if not impossible, and that the objects of the American Road Builders' Association would not be promoted by the proposed affiliation while its efficiency and dignity would be impaired. It was generally felt by the members and friends of the association at the time of this action that a wise step had been taken, and this belief has since been amply justified.

The organization of the association was considerably modified last year by action taken at a meeting held on Aug. 26, 1911, when new officers were elected and a new constitution and by-laws adopted. By the terms of the constitution, the directors have

the general management of the affairs of the association, as trustees, the active work being delegated to an executive committee of three. There are five classes of members—active, associate, honorary, contributing and life. Active members, who comprise the largest class, are persons actively engaged in highway work or those interested in highway development; associate members are societies or other organizations having objects similar to those of the American Road Builders' Association; honorary members are those who have won distinction in advancing road improvement or, in actual work; contributing members are commercial

bodies contributing \$100 per year, and life members are active or associate members, making payments of \$500 upon their election to membership.

The present officers of the association are as follows:

President, Nelson P. Lewis, M. Am. Soc. C. E., Chief Engineer, Board of Estimate and Apportionment of New York City; First Vice President, Harold Parker, M. Am. Soc. C. E., Ex-Chairman, Massachusetts Highway Commission; Second Vice President, J. D. Meriwether, Road Engineer, New Mexico State Highway Commission; Third



JOHN L. SHUFF,
Chairman
Entertainment and
Reception Committee.



ARTHUR STEM,
Chairman
Finance Committee.



J. H. SUNDMAKER,
Member
Finance Committee.

THREE MEMBERS OF THE LOCAL COMMITTEES AT CINCINNATI.

Vice President, W. A. McLean, Provincial Engineer of Highways of Ontario, Canada; Secretary, E. L. Powers, Editor "Good Roads"; Treasurer, W. W. Crosby, M. Am. Soc. C. E., Consulting Engineer, Maryland State Roads Commission.

Directors whose terms expire in 1915 are: A. W. Dean, M. Am. Soc. C. E., Chief Engineer, Massachusetts Highway Commission; S. D. Foster, Assoc. M. Am. Soc. C. E., Chief Engineer, State Highway Department of Pennsylvania; P. L. Hardison, State Highway Commissioner of Maine; Frank D. Lyon, Ex-Deputy, New York State Commission of Highways; W. J. Roberts, M. Am. Soc. C. E., State Highway Commissioner of Washington; Clifford Richardson, M. Am. Soc. C. E., Consulting Engineer.

Directors whose terms expire in 1914 are: James H. MacDonald, State Highway Commissioner of Connecticut; Austin B. Fletcher, M. Am. Soc. C. E., State Highway Engineer of California; Charles Henry Davis, M. Am. Soc. C. E., President, American Road Machine Co.; John R. Rablin, M. Am. Soc. C. E., Chief Engineer, Metropolitan Park Commission of Boston; Charles P. Price, Assoc. Am. Soc. C. E., Manager, American Tar Co.; Arthur H. Blanchard, M. Am. Soc. C. E., Professor of Highway Engineering, Columbia University.

Directors whose terms expire in 1913 are: Logan Waller Page, M. Am. Soc. C. E., Director, U. S. Office of Public Roads; R. A. Meeker, State Highway Engineer of New Jersey; A. N. Johnson, M. Am. Soc. C. E., State Highway Engineer of Illinois; Wm. H. Connell, Assoc. M. Am. Soc. C. E., Chief, Bureau of Highways and Street Cleaning of Philadelphia; C. E. Woodbridge, Sales Manager, The Texas Co.; F. E. Ellis, Road Contractor.

The Executive Committee consists of President Nelson P. Lewis, Secretary E. L. Powers, and F. E. Ellis, of the Board of Directors.

The objects of the association are, briefly stated, the collection and dissemination of information relative to the organization of state highway departments or analogous official bodies having in charge the work of road building and also to the methods of construction and maintenance followed in the United States and Canada; the stimulation of interest in these subjects, and the promotion of such measures, educational and otherwise, as make for the accomplishment of this object. Though by no means losing sight of what may be termed the propaganda feature—the sole object of practically all other road organizations—the American Road Builders' Association confines its attention at conventions to the practical questions of road and street construction and maintenance, and the questions of organization and administration. By this means, and by the personnel of its membership, the acknowledged authority of the speakers at its conventions and the arrangement of its convention programs with reference to the needs of all, the association has succeeded in making its annual meetings the most important gatherings of their kind held in this country. Each succeeding convention has brought together a larger number of road builders than the preceding meeting, and the proceedings have been of greater practical value each year.

At the time of going to press, plans for the ninth annual convention at Cincinnati, Ohio., had been practically completed, and those in charge of the arrangements were looking forward to a convention surpassing in interest and importance any previously held. Cincinnati, a city of exceptional facilities for the holding of the convention, was selected this year, and valuable assistance in preparing for the meeting was given by the city and its citizens. Music Hall, the meeting place of the congress, not only affords excellent facilities for that purpose but is also admirably adapted to the housing of the exhibits. The portion used for the exhibition—the north wing of the

building—is of heavy construction, the first floor being capable of sustaining the heaviest machinery, while the second floor provides ideal accommodations for the exhibits of states, municipalities and engineering schools, and similar displays. At the time of going to press, a large portion of the available space on the first floor had been taken by machinery and material dealers, and applications for space were still being received. Among other exhibits for which space had been reserved were those of the United States Office of Public Roads; the District of Columbia; the states of Illinois, Kentucky, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Tennessee, Virginia, West Virginia and Wisconsin; New York, Cincinnati and other cities, and the Massachusetts Institute of Technology and the Rensselaer Polytechnic Institute. It was expected that in the time intervening before the opening of the convention many other exhibits of this kind would be provided for.

Two committees of citizens of Cincinnati were appointed several weeks prior to the convention to take charge of the local arrangements. These committees were as follows:

Finance Committee—Arthur Stem, Chairman; J. H. Sundmaker, Ralph Coney, Frank Kirchner, Jeff Livingston and George Lewis.

Reception and Entertainment Committee—John L. Shuff, Chairman; Stanley Strubel, M. P. Scully, H. H. Lippelmann, Victor T. Price, H. M. Waite, Clinton Cowen, Carl F. Striet, B. F. Dulweber, Otto Armleder and Lawson Moores.

Celebrate the Opening of Highways at Spokane, Washington.

The Spokane County Good Roads Association held a luncheon and discussion at Spokane, Wash., October 30, in celebration of the formal opening of Sunset Boulevard and the Apple Way, Spokane's new highways.

At the luncheon, which was presided over by President W. H. Cowles, of the association, several speakers made addresses appropriate to the occasion.

Secretary F. W. Guilbert reviewed the work of the association, showing that its functions were to draw up proposed legislative acts and to cooperate with the Legislature in the passing of the right kind of road laws, to cooperate with the county commissioners and the county engineers in the building of roads in Spokane County, and to conduct educational work in the townships and county along the lines of standardizing the character of roads to be built. He also stated that the association had done effective work in getting the split log road drag used, over 100 of them now being in operation throughout the county.

E. E. Flood, Rosalia; Stanley Hallett, Medical Lake; George W. Darknell, Fairfield, and W. J. Sutton, Cheney, all vice-presidents of the association, spoke on the work of the association and of the benefits which will be derived from the new highways.

In the city of Grand Forks, N. D., complete detailed histories are kept of all pavements. The records are kept on canvas covered plats, on which are shown all the details of the pavement and drainage. Whenever an opening is made in a pavement, its location is accurately marked on the plat and a record is also made on the plat giving details of the work.

The Engineer-Commissioners of the District of Columbia have recently purchased a portable asphalt repair plant from the Warren Bros. Co., of Boston, Mass., and are using it on work in the northeastern section of the city. Repair work in the capital has heretofore been done by contract, and it is said that the probabilities are that a municipal asphalt plant will eventually be established so that the city may take over all such work.

Earth, Sand-Clay and Similar Materials; Qualities and Methods of Application*

By W. S. KELLER†

It matters not how active we are in our efforts to encourage the construction of macadam, gravel and other hard surface roads, there will, of necessity, for years to come, be a greater percentage of earth roads in nearly every state. The reasons for this are apparent to any one familiar with conditions from a financial standpoint, to say nothing of the lack of road building material in a large number of counties.

We are informed by the United States Office of Public Roads that in 1909 the United States had 2,009,170 miles of unimproved roads. Assuming that since then the number of miles of improved roads has increased ten per cent., we will have left 1,808,253 miles. If these figures are approximately correct, should not the question of the proper construction and maintenance of these roads receive our most careful and thoughtful attention?

Very few earth roads have, in the true sense, been constructed. The average road is opened without regard to grades or proper location, but is so located as to pass A, B and C's houses or follow a section line. The opening consists of cutting down any trees or brush that can't be avoided by crooks and bends, leaving the stumps just high enough to allow a wagon to pass over and requiring expert driving to miss. This highway is then ready for traffic. Unfortunately, homes have been built and other improvements made near and abutting on these old roads and to such an extent that it is detrimental to such property to make any great change in location to rectify bad alignment and grades. Of course, in many places beneficial changes can be made that will be an advantage, not alone to the road but also to the abutting property.

As to the proper construction of an old earth highway: The road should be gone over carefully by an engineer and such changes of a beneficial nature as can be made should be noted, taking into consideration initial cost, cost of maintenance, alignment and grade.

The center line and grade of the road should be established. The road should be so graded that the ditches or gutters will be parallel to the center line of the road and at a uniform distance from it. When complete, the road should be uniform in width and surface, smooth and even, free from holes and high places, with a uniform crown and a fall, ordinarily of 1 in. to 1 ft., from center to gutters. No fixed crown can be established for such roads, owing to the various kinds of earth encountered. Observation and experience will soon teach a practical man which is best. On grades, this ratio of fall should exceed the grade to such an extent that water will readily flow to the ditches instead of down the road. Drain pipe should be used freely and no water should be allowed to flow over the road if it can be avoided. In some cases it is not practicable to build the road above water, and in such, danger signs should be posted, showing at what stage the water becomes too high to ford the stream.

We have in the South nearly every kind of soil, from sticky gumbo on the one hand to coarse sand on the other. The methods used for the improvement of roads through a section of one will not do altogether for the other. The worst by far that we have in the South are in our rich and

fertile prairie lands where, unfortunately, there is very little road building material to be found. This soil readily absorbs water and becomes very sticky after rains. It expands freely and dries rapidly when the sun shines and becomes very hard under the tamping effect of teams and vehicles. From observation and experience I have learned that these roads, of all others, require a very high crown, and the driving surface should be only wide enough to allow two vehicles to pass. If a prairie road is narrow, with a fall of not less than 1½ ins. to the foot, water will shed rapidly to the ditches and the entire surface will dry out quickly. A road of this kind can be constructed quickly and at little expense—except where grades are to be reduced or bottoms are to be filled—with a grading machine or even with a split log drag. The latter method will require more time, but in the end will be found to be very satisfactory.

No earth road can be maintained in good condition unless it is so constructed as to drain well, and unless it is kept free from ruts and holes. The best method of maintaining an earth road, especially a prairie road, is by the systematic use of the split log drag. A sand road is never good under any circumstances, but certainly is not improved by crowning. A sand road is at its best when moist and should be left flat. No one wants a sand road, so if possible, clay should be added to and mixed with sand, making what is known as a sand-clay road.

In the preparation of this article, on a subject which has been so ably treated in bulletins by the United States Office of Public Roads, I am conscious of my limitations and do not attempt to write a text-book or theoretical article, but simply a statement of what sand-clay roads are and how they are built.

Every farmer who lives in a section of country where both sand and clay are prevalent, is very likely constantly traveling over a section of natural sand-clay road, and still, more likely, is ignorant of the fact. He can, no doubt, call to mind some particular spot on the road he travels, though it may not be more than 100 ft. in length, that is always good and rarely requires the attention of the road hands. Good drainage will be noticed at this place, and if he takes the trouble to investigate, he, no doubt, will find that a good mixture of sand and clay forms the wearing surface. If this 100-ft. stretch of road is always good, then why can't the entire road be made like it? It can, provided man will take advantage of the lesson taught by nature, and grade the road so that the drainage will be good and then surface the balance of the road with the same material. If it is not possible to find this ready mixed surfacing material convenient to the road to be surfaced, it may be possible to find the two ingredients in close proximity. In case the road after grading shows an excess of sand, clay should be added, or, in case clay predominates, sand should be added to produce good results. There are four general ways in which sand-clay roads may be built:

1. Ready mixed sand and clay placed on a clay, sand or ordinary foundation.
2. Sand and clay placed on a soil foundation and mixed.
3. Clay hauled on a sand foundation and mixed with sand.
4. Sand hauled on a clay foundation and mixed with clay.

*Paper presented at the American Road Congress, Atlantic City, N. J., Sept 30-Oct. 5, 1912.

†State Highway Engineer of Alabama.

Taking up these various methods in order, the following observations may be made:

First: A natural mixture of sand and clay can nearly always be found where, as stated before, the two are found separately. The most important point is to know the natural mixture when seen. The very best guide to this is to be had from the observation of roads in the immediate vicinity in order to find a natural piece of good road. This accomplished, a sample taken from the best of this good section will, by comparison, enable you to find what is required close to the road to be surfaced. This natural mixture of sand and clay can be noticed in any section of the country where red clay and sand are found, usually outcropping well up in the hills and, in ditches and cuts, having the appearance of red sandstone. A real good stratum of well mixed sand and clay will stand perpendicularly in cuts and ditches resisting erosion almost as well as sandstone. A test of the best natural sand-clay mixtures will show that sand forms about 70 per cent. of the whole. The test is simple. Take an ordinary medicine glass, measure 2 oz. of the mixture into the glass and wash out the clay. Dry the remaining sand and measure again in the medicine glass. The loss of course will be the amount of clay originally contained in the glass. The theory of the sand-clay mixture as a road building material is that the clay fills the voids between the grains of sand, firmly binding them together. The sand forms the wearing surface. In other words, we may say that the clay is the binder and that the sand is the wearing surface.

After the material has been found, the process of building the road is simple. Before placing any sand-clay on the road, the road should be graded to the desired width. I prefer to have a good width for the crown of the road, say 24 ft. exclusive of side ditches, each of which is usually about 3 ft. wide. Sand-clay is cheap, and I would advise that 16 ft. of the graded width (24 feet) be surfaced. This will leave a 4 or 5-ft. shoulder on either side. The surface of the graded road should be flat or slightly convex. The sand-clay should be put on from 8 to 12 ins. in thickness, depending on the character of the subgrade or foundation. Where you have hard clay for a foundation, 8 ins. of sand-clay will suffice. If the subgrade is sand, it is well to put on as much as 12 ins. of the surfacing material. After a few hundred feet of surfacing material have been placed, a grading machine should be run over it to smooth and crown the road surface before the top becomes hard and resists the cutting of the blade. It is a good plan to turn the blade of the machine so as to trim the edges of the surfaced part, discharging the excess sand and clay upon the earth shoulders. After one round trip with the blade turned out, the remaining dressing work with the machine should be with blade turned in with the exception of one trip down the center of road with blade at right angles to the axis of the road for the purpose of distributing any excess of material left in the center.

After the machine work, it is well to follow with a split log drag, which smooths any rough places left by the machine and leaves the road with a smooth, even surface. It must be borne in mind that a sand-clay road, unlike other roads, cannot be finished in a short time. It can, of course, be left in an apparently finished condition with a hard, smooth surface, but it will be found on close examination that the hard surface is in reality only a crust, underneath which there are several inches of loose material. After the first hard rain the crust softens, the road gets bad and the work appears to be a failure. This, however, is just what is needed to make it eventually good. After the surface has dried until the mass is in a plastic state, it should be dragged until the surface is once more smooth and properly crowned and should be kept this way by dragging at

least once a day until the sun has baked it hard and firm. The mistake of keeping traffic off during this process of re-setting should not be made. The continuous tamping by the wheels of wagons and the hoofs of horses is just what is needed to compact the sand-clay into a homogeneous mass. The ordinary roller is not very effective in this work, though it would appear that a tamping roller, such as has been used in the construction of oiled roads in California, would be very effective. A split log drag is an indispensable machine in the construction of any kind of clay road.

Second: Sand and clay placed on a soil foundation and mixed is necessary where the old road has neither a sand nor a clay foundation and it is impossible to find the two ingredients ready mixed but possible to get both separately near at hand. The clay should first be placed on the road to a depth of 4 ins. and the required width. It is not wise to place more than a few hundred lineal feet of clay before the sand is hauled, as the clay rapidly hardens and makes the mixing process difficult. After clay has been placed over, we will say, 400 ft., the clay should be broken by means of a plow and harrow if it has become hard, and sand to a depth of 6 ins. placed on it. This should be plowed and harrowed in thoroughly. This is best done immediately following a rain, as the two can then be more satisfactorily mixed. The traffic aids the mixing and should be encouraged on the road. After the mass appears to be well mixed, the road should be properly shaped, as previously explained. The road should be given watchful attention and should sand or mud holes appear, a second plowing and mixing should be given it.

Third: When clay is hauled on a sand foundation and mixed with the sand, the mixing process is similar to that described under the second head. It is only necessary to add that as the foundation is sand, a little more clay will be necessary than where the foundation is of clay or soil.

Fourth: When sand is hauled on a clay foundation and mixed with clay the clay foundation should be plowed to a depth of 4 ins. and harrowed with a disk or tooth harrow until all lumps are thoroughly broken or pulverized. Sand should then be added to a depth of 6 ins. and mixed as before described.

Sand and clay can be mixed best when wet, but as most road construction is carried on in the summer months, it rarely rains just when you are ready, so you will have to do most of the mixing dry and keep the road in shape after the first two or three rains, while the passing wagons and vehicles give the road a final wet mixing. The cost of sand-clay roads, like any other kind, varies greatly, depending on the character of grading and the proximity to the road under construction of the surfacing material. Good sand-clay roads can be built in the South for from \$500 to \$1,500 per mile. In some places where underneath a 5 or 6-in. surface of sand a good sand-clay is to be found, and where this is on a level stretch of road, a mile can be built by means of a large grading plow and machine, turning the sand under and shaping the road up, for \$250 or \$300.

A sand-clay road is the cheapest road to maintain, for the reason that it can be repaired with its own material. By this I mean that with a split log drag or grading machine ruts can be filled with material scraped from the edges, whereas on gravel or macadam roads, such is not possible. The repairing of these roads can be done almost exclusively with the split log drag, only enough hand work being required to keep the gutters open and the growth of weeds out of the shoulders.

Those contemplating the construction of sand-clay roads or any other kind of roads should bear in mind that in road construction—more perhaps, than in any other kind of work—does the old adage of "What is worth doing is worth doing well," apply.

Highway Engineering Education*

By ARTHUR H. BLANCHARD, C. E.†

The educational training of the engineer who may enter that branch of civil engineering devoted to the economics, construction and maintenance of highways should be considered from two standpoints: First, the essentials, which, from an educational point of view, are considered as prerequisites to a successful career in highway engineering; and, second, practical methods of securing this training under American conditions.

The American youth who has expressed the desire to enter the profession of engineering has various channels open to him. The usual course followed is to enroll in one of the four-year engineering courses designated as civil engineering, mechanical engineering, electrical engineering, chemical engineering or mining engineering. There are, however, notable deviations. Several institutions and some engineers advocate a broader training for the engineering profession than is possible in the ordinary four-year course, and, in fact, believe that the profession of engineering demands the same type of training as is now universally recognized as desirable for men entering the legal or medical profession.

Usually, the American boy entering on a technical career has not fully made up his mind as to the particular field in which he is most interested. In the four-year courses he has in some cases one, and in others two years in which to make up his mind as to which of the five general branches of engineering referred to above he wishes to enter. It is self-evident that the ideal training is one which will prepare a student upon graduation to enter any one of the numerous fields of engineering. At least it is possible that a comparatively wide field of activities will be open to a man whichever one of the above courses he takes in the technical school.

Having these general facts in mind, attention will now be riveted upon the situation which confronts the young man who may be one of our future highway engineers. Let us suppose, for example, that he has decided to devote four years to securing a technical education and that there is offered to him the four-year course in civil engineering and a four-year course designated as highway engineering. Which course should he take? The evils of over-specialization in the undergraduate engineering course have been fully discussed in the Society for the Promotion of Engineering Education. Suffice it to say in this discussion before the general public interested in highway improvement that the graduate of the civil engineering course on the one hand has before him a large field of activities, for all of which he is equally well equipped. For instance, he may enter the field of structural engineering, sanitary engineering, railroad engineering, geodetic engineering, hydraulic engineering, highway engineering, irrigation engineering, and in many cases mechanical, electrical and mining engineering. On the other hand, a graduate from a so-called four-year course in highway engineering has, if the course is made up of the subjects which the title implies, only a limited field in which he considers that he is particularly proficient.

The consensus of opinion of eminent highway engineers and educators is to the effect that the highway engineer of the future requires the broad foundation which the four-year course in civil engineering gives. A knowledge

of practically all of the subjects included is found of value in the manifold duties imposed in the various positions which he may occupy in the service of municipalities, states, counties, towns, estates, contractors' organizations, consulting engineers' offices and manufacturing companies.

In the consideration of the training received and the subjects covered in the four-year course in civil engineering relating especially to highway engineering, it is of interest to note the present status of highway engineering in the civil engineering courses of American universities and technical institutions. An examination of the latest catalogues received from ninety-two institutions in the United States offering courses in civil engineering showed that seventy-eight included a text-book-lecture course in highway engineering in the curriculum. The number of recitation-lecture hours in the various courses may be arranged approximately in the following groups: Thirteen, 15 hours or less; twenty-eight, 30 hours; seventeen, 45 hours; six, 60 hours; six, 75 hours; three, 90 hours; three, 120 hours; one, 135 hours; and one, 165 hours. Fifteen give some instruction in laboratory work, while ten include special courses in highway surveying. In the case of institutions devoting over ninety hours to highway engineering, the general civil engineering course covers three years while a highway option is taken in the fourth year. A comparison of the present status of highway engineering education as outlined above, with the conditions described by Logan Waller Page in his valuable paper on "Highway Engineering," presented before the Society for the Promotion of Engineering Education in 1909, is certainly encouraging, especially when it is remembered that only three years have elapsed. In 1909, according to Mr. Page, fifty per cent. of the institutions investigated did not include a course on highways in the civil engineering curriculum, while it is noted that of the courses in ninety-two institutions examined by the speaker, eighty-five per cent. now give a course in highway engineering.

The importance of the subject of the economics, construction and maintenance of roads and pavements in the United States at the present time demands that more prominence should be given to the course in highway engineering in civil engineering curricula. Having in mind the various component parts which go to make up the curriculum, it appears that a well-balanced civil engineering course under present conditions should contain a three-hour course of one year in length devoted to highway engineering.

In such a course lectures and text-book work should cover the following topics: Historical review of the construction of roads and pavements; preliminary investigations incident to construction; principles of surveying and mapping peculiar to highway work; design of highways; drainage and foundations; construction and maintenance of earth, sand-clay, gravel and broken stone roads, including a consideration of the materials which enter into their construction; general consideration of bituminous materials, as such, and of their use in the construction of bituminous surfaces, and bituminous macadam, bituminous concrete, sheet asphalt and asphalt block pavements; the construction and maintenance of wood block, stone block, brick and cement concrete pavements; dust prevention, street cleaning and snow removal; construction of car tracks and pipe systems; comparison of roads and pavements; construction of sidewalks, bridges and culverts,

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and a general treatment of economics, highway administration and highway legislation.

Laboratory work should be limited to what is sometimes called lecture demonstration work by the officers of instruction. In other words, although it is advisable that the methods of testing all kinds of bituminous and non-bituminous road materials should be brought to the attention of students in civil engineering by actual demonstrations in the laboratory or lecture room, it is not considered advisable to devote the time necessary for each student to run through complete tests as is done by students in the laboratories devoted to the testing of structural materials. In two to five afternoons all the fundamental tests employed in the examination of bituminous and non-bituminous road materials could be demonstrated before a group of from twenty-five to thirty men, if the laboratory equipment were properly arranged and the work well planned. Two to three afternoons would suffice if the testing of bituminous materials were covered in a course given by the department of chemistry. Unfortunately at the present time very few instructors in chemistry are familiar with bituminous materials, hence the methods of testing will have to be worked up by civil engineering instructors. Eventually some of the time now given by the department of chemistry to carbon compounds or quantitative analysis in courses for civil engineering students can be profitably devoted to the chemistry of bituminous materials.

A limited number of inspection trips covering the economics of highway location and the construction and maintenance of various types of roads and pavements will be of value.

The time devoted to road or street surveys in some institutions, in addition to the regular work in railroad surveying and general surveying, is of questionable merit. Although there are many problems in highway surveying which are different from those encountered in other branches of surveying, it is doubtful if it is necessary or expedient to use up valuable time on this work considering the number of subjects which it is necessary to include in a broad course in civil engineering. The speaker's experience with civil engineering graduates who have worked under him on highway work has led to the belief that a graduate in civil engineering who has had a good course in railroad surveying and in railroad curves, together with a comprehensive course in highway engineering as outlined above, is admirably equipped to occupy the minor positions in a field party on highway surveys. In these positions he may acquire, either through advanced study or special instruction, the information and practice necessary to occupy the position of chief of party and the higher positions in the highway department connected with the bureau of surveys. It is, however, advisable in certain instances, where practicable, to divide the time devoted to railroad surveying so that a highway survey outside built-up districts may be added to the course, together with the preparation of plans, cross sections and estimates.

In further consideration of the special training which will be of benefit to those entering the field of highway engineering, the educational plans which have been evolved to elevate the profession and to equip men thoroughly for this field of engineering work, foreign practice will be given consideration first.

Great Britain affords an illustration of one method by which well-trained highway engineers may, under favorable circumstances, be secured. Fortunately for the British engineer, his position in highway work is much more permanent than in the United States. There are several reasons why such is the case. Among others may be mentioned the recognition by the British public that the

principle of continuity in office of capable engineers results generally in economical and efficacious construction and maintenance of public works. Those American engineers who visited Great Britain at the time of the Brussels International Road Congress in 1910 will, without doubt, find the majority of the prominent highway engineers of England occupying the same positions or higher positions when they attend the Third International Road Congress to be held in London in 1913. This is not a long period, but could the same observation be made in regard to the personnel of many of our great State highway departments for a similar period? It should be stated, however, that the subordinate positions in the United States, being in many cases, under Civil Service regulation, are more permanent than those affected by political exigencies. This condition of permanency of position of high officials in Great Britain means that it is possible for young men who are attracted to highway engineering to enter the department of some county or municipal engineer, and, proving capable, to acquire a valuable experience under the continued leadership of an able engineer. In this position a young man of the right caliber may, by hard work, including a large amount of home study, equip himself for the highest positions in highway work in Great Britain. Another safeguard of the British engineer, and an incentive to highway engineers in embryo, is the admirable practice which has been adopted in many cases requiring that applicants for a certain class of position shall hold certain grades of membership in the Society of Municipal and County Engineers, and in other cases certain grades of membership in the Institution of Civil Engineers of Great Britain.

France offers an entirely different type of training for men who are going to enter the field of highway engineering. All the important positions in this branch of the public service are occupied by picked men especially educated and trained for the service. After a preliminary general education covering as a final period that comparable with the four years of high school training in this country, men of high standing are admitted to the Ecole Polytechnique, the course in which is practically two years in length. Upon graduation from this school the men of high standing are allowed to select one of the several national schools, provided openings exist, in which they will secure special training for the public service in a given field. Those who enter the Ecole Nationale des Ponts et Chaussées devote three years to a general course in civil engineering under the leadership of engineers of the highest grade in the Department of Bridges and Roads of France. During the vacations these men are allotted to service on the construction of roads and bridges in various parts of France. It is evident that the training thus obtained is admirable and that the personnel of the engineering staff of the Department of Roads and Bridges of France is exceptionally high.

In America, while in some cases an attempt has been made to give as special instruction in highway engineering a four-year undergraduate course in this subject, this method has not given particular satisfaction for the reasons previously noted. Excellent work has been done by many universities in several parts of the country in giving extension courses to groups of men interested in various phases of highway improvement. Very little advanced work, however, has been done through the medium of the American university. The United States Office of Public Roads has evolved a scheme by which men may secure a certain amount of advanced instruction and training in that part of highway engineering dealing with highways outside of built-up districts. This plan is to place the student engineers in the charge of men in the service of the office in various parts of the country on different kinds

of highway work. When it is impossible to work in the field the men do a certain amount of office work at Washington, receiving instruction by means of lectures on certain phases of highway engineering, and also do laboratory work on the testing of both bituminous and non-bituminous road materials.

In 1911, through the generosity of Charles Henry Davis, President of the National Highways Association, there was founded at Columbia University a graduate course in highway engineering. The object in founding this course was to elevate this branch of the engineering profession and to provide an opportunity for men engaged in highway work to obtain advanced instruction and training in the various phases of highway engineering under the most favorable conditions. For many reasons it is fortunate that the first course of this character should be found at a university presided over by a president and trustees who look upon the work of the university from an exceptionally liberal standpoint. While maintaining the high character of all degrees conferred, nevertheless these men believe in opening the courses of instruction to any mature man provided he has the prerequisites for any given course and earnestly seeks information. Likewise it is fortunate that the administrative authorities allow the introduction of an innovation as far as the period of attendance is concerned, inasmuch as the graduate course referred to is given in the period from December 1 to April 1. An engineer, therefore, who desires to take all the graduate courses in highway engineering and allied subjects which fulfill the requirements for the master's degree will necessarily be in attendance for two winter periods, the equivalent of one collegiate year. The selection of this period in which to give the instruction was based upon the prevailing idea among leading highway engineers that it would be feasible for many men to obtain a four months' leave of absence during the dull period of the year. This prediction has been found to be correct.

As this plan is somewhat of an innovation in engineering education, it may be of interest to cite certain facts in connection with the attendance during the winter period of 1911-1912, which was the first period under this plan. Although the graduate courses were not brought to the attention of engineers until November, 1911, there were in attendance fifteen men affiliated with highway work, thirteen of whom registered as candidates for the master's degree. It is of interest to note that this group included men connected with state highway departments, contractors' organizations, municipal departments, engineering-sales departments of manufacturing companies, county highway departments and consulting engineers' offices. The experience of these men ranged from one to twelve years. They came from widely distributed localities, Connecticut, Massachusetts, New York, Pennsylvania, Maryland, North Carolina, Alabama, Panama and British Columbia being represented.

The curriculum of the graduate work in highway engineering comprises advanced courses in the economics and design of roads and pavements, including a thorough discussion of bituminous surfaces and bituminous pavements; highway bridges and culverts; mechanical appliances used in highway engineering; road and street surveying and highway design; highway laws and systems of administration; management engineering; bituminous and non-bituminous road material laboratory courses; seminars in highway engineering literature; chemistry of bituminous materials; engineering geology; optical mineralogy, and the inspection of various types of roads and pavements and manufacturing plants producing highway materials.

A large staff of non-resident lecturers in highway engineering, which includes many of the most prominent

highway engineers and chemists in the United States, is employed to give instruction on specified subjects forming an integral part of the various courses. It was decided to throw these special lectures open to the engineering public and to hold the same during evening sessions in order that this feature of the work might be of maximum benefit to all that might find the university accessible. An attendance of from fifty to one hundred engineers at many of the lectures during the past winter period showed the interest taken in the many problems of highway engineering presented.

During the 1912-1913 winter period a special arrangement will be introduced which is considered of particular interest to practicing highway and chemical engineers. Many who cannot secure a four months' leave of absence have expressed the desire to devote from six to seven weeks at Columbia University in securing information relative to the manufacture and testing of all kinds of bituminous materials and their use in the construction and maintenance of bituminous surfaces and bituminous pavements. Arrangements have, therefore, been made so that courses covering the above subjects may be taken either independently or as an integral part of the unified graduate course in highway engineering. During a continuous period of about six weeks, beginning in the latter part of December and ending during the first week of February, three courses will be offered as follows: Two weeks will be devoted to a demonstration lecture course on the mining, manufacture and testing of all kinds of bituminous materials; the next two weeks will be devoted to a course on bituminous surfaces and bituminous pavements, while during the final period of two weeks will be given a laboratory course in which those enrolled will test various types of bituminous materials, make analyses of unknown materials, and write specifications covering the use of bituminous materials under varying conditions. Each course will comprise forty lectures or eighty laboratory hours, depending upon the character of the course.

During the coming year at Columbia it is expected that another innovation will be introduced, inasmuch as, in connection with the graduate work in highway engineering, there will be founded several research fellowships by various manufacturing companies. The research workers holding these fellowships will investigate problems of particular interest and value to the manufacturing concerns founding the same. It is expected that many problems of wide interest to those engaged in highway work will be thoroughly investigated through this medium. While admirable work has been done along many lines in the research laboratories of our universities, the speaker earnestly hopes that more attention will be given in the next decade than in the past ten years to the multitude of problems in highway engineering which demand the best efforts of investigators for their ultimate solution.

The county authorities of Berrien County, Michigan, have voted to submit a proposition to issue county road bonds to the amount of \$500,000 to the electors at the spring election. It is said that the bond issue is generally favored throughout the county, and it is predicted that the question will be voted upon favorably, in which case it is expected that 200 miles of road will be built within the next five years.

During the past year there have been improved in Columbiana County, O., eight stretches of country road at a total cost of \$144,614.37. The work was done under the Dodge law by which the property owners living along the highway pay 10 per cent. of the cost of improvement, the trustees of the township pay 15 per cent. and the county commissioners 75 per cent.

Physical Testing of Road Building Rock—II

In the issue of November 2, the tests used in the United States Office of Public Roads for hardness, toughness and abrasion were described and some of the principal machines illustrated. In the following paragraphs, the remaining tests made upon rock samples in that laboratory—those for cementing value, specific gravity and absorption—will be considered.

Cementing Value

Investigations in the United States Bureau of Chemistry, according to Bulletin No. 44 of the United States Office of Public Roads, from which the data in regard to the

follow that all hydrated rock powders will cement. It seems that only a certain kind of water of combination is concerned with and measures the cementing value. This property is undoubtedly related to that of plasticity in clays and, in a few words, is due to the amorphous inorganic particles, which by reason of their characteristic porous structures are able to absorb and hold water, thereupon assuming a plastic and coherent condition."

The general method followed for determining the cementing value is the grinding up of the specimen, the mixing of the powder obtained with water to form a stiff

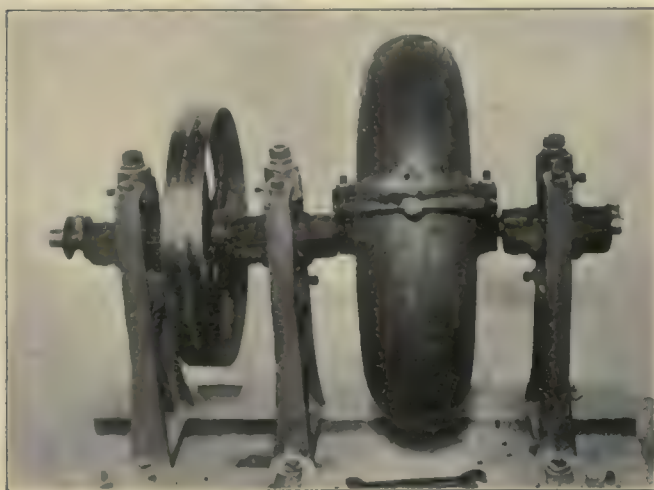


FIGURE 6.—BALL MILL.

tests described herein were taken, indicate that cementing value depends on certain hydrated colloid conditions of the particles. "All rock powders that cement well," according to Bulletin 79 of the Bureau of Chemistry, "are hydrated, i. e., contain water of combination, although it does not



FIGURE 7.—BRIQUETTE FORMING MACHINE.

paste, the molding of this paste into briquettes and the testing of these briquettes for impact by means of an apparatus known as the Page impact machine for testing the cementing value of rocks.

One-half kilogram of the rock to be tested is broken

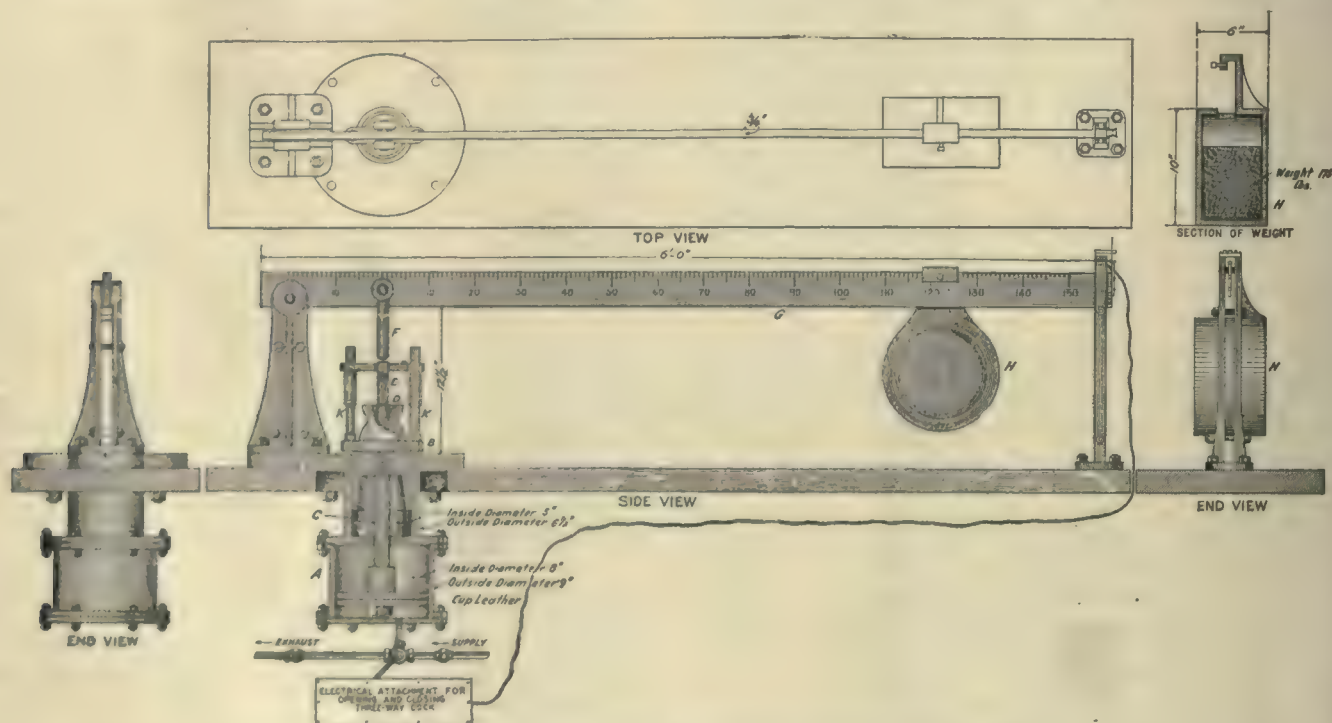


FIGURE 8.—DETAILS OF BRIQUETTE FORMING MACHINE SHOWN IN FIGURE 7.

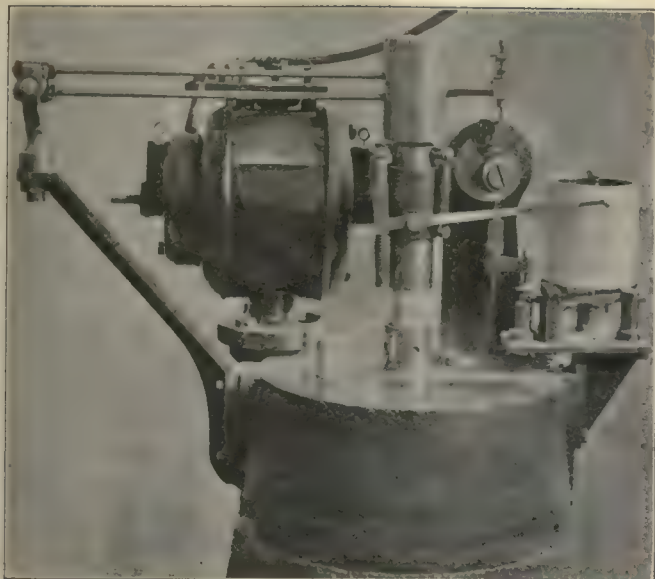


FIGURE 9.—PAGE IMPACT MACHINE.

sufficiently small to pass a screen of $\frac{1}{2}$ -in. mesh, and the resulting material placed in a ball mill with about 90 cc. of water. The mill, which is shown in Fig. 6, consists of a cast iron casing, 25 ins. in diameter and 7 ins. in thickness at the center, both inside measurement, mounted as shown and containing two cast steel spheres 5 ins. in diameter and weighing 20 lbs. apiece. The material is ground in this for $2\frac{1}{2}$ hours at the rate of 2,000 revolutions per hour, after which the "dough" is taken out and formed into cylindrical briquettes, 25 mm. high and 25 mm. in diameter, in a special briquette forming machine, which is shown in Figs. 7 and 8.

This machine is described in the bulletin as follows: "The hydraulic cylinder A supports an iron platform B through the piston rod C. The cylindrical metal die D provided with a closely fitting plug E supported by guide rods KK and containing the material to be compressed is placed upon the platform and water admitted to the cylinder through the supply pipe I. As the piston rises, the platform and die are carried up with it, and the plug of the latter comes in contact with a properly weighted lever arm G. The weight H is adjusted on the lever arm so as to give a maximum pressure of 132 kg. per sq. cm. on the compressed material, but this pressure is applied for only an instant. The total time of compression up to the maximum is about 30 seconds. The electrical attachment shown is not used at present, as it has been found more satisfactory to operate the water supply by hand."

Five of these briquettes are made from each test sample and allowed to dry 20 hours in air and then for 4 hours in an air bath at a temperature of 200° F. They are then cooled for 20 minutes in a desiccator and tested in the impact machine, shown in Figs. 9 and 10.

This machine consists of a hammer G, actuated by a cam E and falling upon a plunger H, which rests on the briquette I, placed upright on the anvil J. The machine is driven by an electric motor A, and is equipped with a recording drum M. The sample is placed in position as indicated and the machine driven at the rate of 60 r.p.m. The hammer is raised by means of the adjustable pin F, which slides over the face of the cam. This pin may be so adjusted that with the plunger H resting on the briquette I and with the end of the pin in contact with the cam, as indicated in the drawing, the effective drop of the hammer will be 1 cm. The reaction of the briquette after each blow causes a vertical movement of the lever arm L, at the end of which there is a brass point which records the motion on a sheet of silicated paper wrapped around the

recording drum. Each revolution of the cam produces a slight motion of the drum, which makes a complete revolution for each 100 revolutions of the cam. The cementing value of the material is taken as the number of blows required to so destroy the resilience of the briquette that no reaction is recorded on the drum.

Specific Gravity and Absorption.

The specific gravity is determined by weighing a small sample of the rock, weighing from 10 to 12 grams, in air while held suspended from a balance by a fine silk thread. The specimen is then immersed in water and weighed, no account being taken of the small error due to the immersed portion of the thread. The specific gravity is then calculated by the following equation:

$$\text{Specific Gravity} = \frac{W_a}{W_a - W_w}$$

in which W_a = the weight in air in grams and W_w = the weight in water in grams.

The absorption test is made on the same specimen that is used for the specific gravity test. It is kept immersed in water for four days, at the end of which time it has attained a constant weight. The absorption is expressed in pounds per cubic foot, and is obtained by means of the following equation:

$$\text{Absorption} = \frac{W'w - W_w}{W_a - W_w} \quad 62.37$$

in which W_a = weight of specimen in air in grams, W_w = weight of specimen in water just after immersion, in grams, and $W'w$ = weight of specimen in water after immersion for four days, in grams.

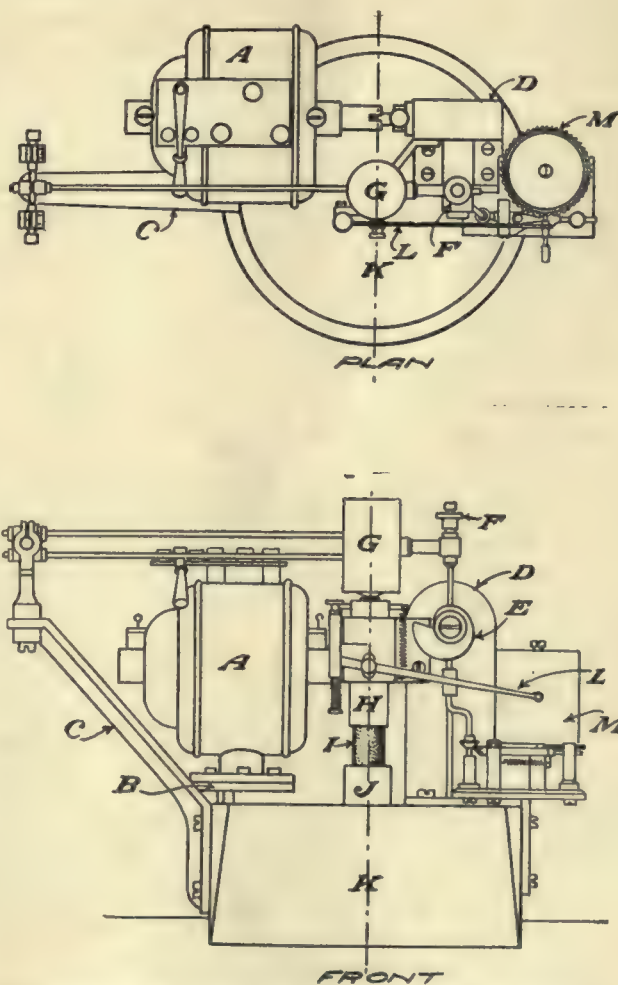


FIGURE 10.—DETAILS OF IMPACT MACHINE.

The Relation of the Contractor to the Public Official*

By C. A. CRANE†

A discussion of the relation between contractors and public officials might be divided under three heads: What they are thought to be, what they are and what they ought to be.

What they are thought to be finds its only parallel in the nursery belief in Santa Claus, which is no more hal- lowed than the time-honored tradition in every newspaper office in the country concerning the financial status of con- tractors. There is never an event chronicled in the press in which a contractor figures, that he is not mentioned as "so and so, the wealthy contractor." All of which prompts the unnecessary question, "Where did he get it?"—unnec- essary because the general public harbors the delusion that the wealth was attained in public contracts in collusion with public officials.

There is perhaps no industry which is so intimately con- nected with the progress and welfare of a country as that of the contractor. His task is the physical development of the locality. The work is in the open and its progress is carefully watched by the community. Every passer-by is a self-appointed inspector; his criticisms are governed more by personal inconvenience than by any real knowledge of how or why the work is being conducted, and proportion- ate with the inconvenience, is the firmness of his conviction that the contractor and the public officials are leagued to- gether in a "public be damned" policy. In any event, it is the popular belief that the contractor is amassing a fortune and only gets his contract through "pull."

In all candor we are bound to admit that there has been great justification for this belief. Doubtless we are all familiar with the practice, sometimes observed in the smaller towns, of receiving the bids in public, but opening them in executive session. To insinuate on the reasons for such a custom is inadequate—experienced contractors know. These irregularities are deplored by honest con- tractors—in fact they are deplored by every contractor ex- cept that particular one who gets the contract—and the very first time he finds the trick has worked in favor of an- other, he shouts the loudest of all.

Just as dishonest officials are in the minority so are honest contractors in the majority, and they are equally anxious with honest officials and the public generally that the contracting business shall be put on a legitimate basis, which will afford every opportunity for honest competition and minimize favoritism and graft.

A recent editorial in one of our large dailies, comment- ing on the expenditure of public funds for a large improve- ment, contained this sentence: "In dealing with contractors eternal vigilance is essential." The implication there, is that the contractor is the culprit—but dishonesty can't thrive single-handed.

Now we take it that one of the purposes of this congress is to correct contract abuses and to establish legitimate practice. You must do that before you can succeed in building good roads or anything else, no matter how theoretically perfect a set of specifications you may devise. Since we must all confess that the relations between con- tractors and officials are not always above suspicion, the problem is to remove the opportunity for suspicion. Why not adopt the policy of the hotel keeper who announced on his bill of fare that "to prevent fruit being taken from the table, there will be no fruit." Cut out all personal rela-

tions between contractors and political officials and let these relations be through the proxy of the engineering of- ficial. Choose a big man in his profession and pay him a big salary—put him under a heavy bond to guarantee the accuracy of his work and the validity of his certificates of payment. Why should a disbursing officer be held re- sponsible for an engineer's voucher, unless he has facilities for checking the work equal to those that the engineer had in computing the amount? Centralize the power and the responsibility.

Contractors prefer contracts with railroads and private corporations to public work, because their dealings are al- most entirely confined to the engineer or the architect, and they are not encumbered with the delays and red tape that characterize our contracts for public work. To one law- suit over a railroad contract, there are a hundred over public contracts—and is this not because the railroads employ a higher grade of men to superintend their con- struction—men who are competent to and do settle disputes fairly, unhampered by the statutes and ordinances under which public work is conducted? It is true there are many of our large public improvements today going forward under the guidance of the best engineering talent in the country. To these few exceptions our criticism does not apply—but to the general custom which places inefficient men in charge of engineering construction on public work.

A serious mistake made by public officials is to under- estimate the necessity for paying high salaries to engineers. Well paid positions will attract a higher grade of men and remove temptations which beset the path of the underpaid engineer in the field. The men in the field are relied upon by both the chief engineer and the contractor, and the greatest risk the contractor assumes lies in the ability of this sub-engineer to whom is delegated the power of inter- preting the contract.

The success of a contract lies in its execution—not in its wealth of legal protection for the "contractee." Take any contract issued today for public work to a lawyer and ask his opinion of it. He will tell you a man is a fool to sign such a document. It is so drawn as to provide every safe- guard for the "contractee," and to place entire responsibil- ity for everything that may happen, including the acts of Providence, up to the contractor. He literally signs away all his rights in the present and hopes for the future. This is not the work of the engineer, but of the legal officials.

But the contractor wants the work, and in the contract- ing business three qualities are essential—faith, hope and nerve, and the greatest of these is nerve. Nerve to disre- gard counsel's warning, faith in his own ability to do the work, and hope that the engineer in direct charge of his work will give him a square deal.

It is impossible to over-emphasize the importance of the relation of this engineer who is in direct charge. He is called upon to give immediate decisions on important ques- tions, in the absence of his superiors. He is clothed with all the powers conferred in the contract and these are likely to be over rather than under-exercised by the too zealous and inexperienced engineer. Care in the selection of his deputies and personal attention to their training by a chief engineer are tremendous factors in securing har- monious relations with the contractors. Constant bickering prevents good work, and the most successful chief engineers have infused into their subordinates the realization that tact and diplomacy win more battles than obstinacy.

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†Secretary, General Contractors' Association.

Most contracts designate the chief engineer as the arbiter of all disputes over the amount and fitness of the work, his decision to be final and binding on the contractor, but this power is usually qualified elsewhere in the contract by providing that the engineer's decision shall be subject to the final determination of the commissioner or the board, as the case may be.

This qualifying clause might easily become a mischief breeder. Any loopholes which permit the slightest chance for questionable dealings between contractors and officials should be guarded against. The days of the contractor with a "pull" are passing. Even the simplest class of public improvements is now supervised by an engineer. The less that contractors and commissioners come in contact the better. The commissioners' attention should be devoted to the administrative details—with matters pertaining to construction left to the engineers. The engineering profession fortunately ranks high in integrity, and the unfortunate cases in which scandal has entered into the contracts are but rarely charged to any dishonest acts by, or collusion with, the engineer. The objection raised to allowing the engineer to be the final judge as to the quantity and fitness of the work, is that since he is paid by one of the parties to the contract he is naturally biased toward his employer, but it is generally conceded that in the majority of cases the engineer who has designed and supervised the work is best fitted to make the decisions. There are many questions, however, which arise that are not concerned solely with quantity or quality—questions of judgment or questions of proper interpretation, and we believe disputes of such nature should be submitted to arbitration. No honest and capable engineer fears or can object to any scrutiny of his work by an equally competent fellow engineer, and, therefore, an appeal from his decision should be allowed before a referee competent to pass upon the technical matters involved. This is the only form of appeal which should be permitted in the contract. An appeal to the board or to a commissioner can be made only for the purpose of securing through friendship, or worse, what the engineer will not allow, and if the board of commissioners is honest and has confidence in its engineer, it naturally will deny the request. The position of the engineer who would be asked by his board to alter his determination would be exceedingly unpleasant. He would be in the dilemma of refusing to obey orders or of certifying to something against his judgment. Engineers are human and jobs are not always plenty, and we realize that engineers have their troubles as well as contractors. To avoid such dilemmas, the engineering profession should demand a form of contract providing that their rulings could only be reversed by arbitration before a member or board of their profession.

We realize that there are many questions of law involved in contracts that are often the subject of division by members of the bench, but we submit that if the preparation of the entire contract, as well as the specifications were left to the engineer, he would at least be able to prepare as comprehensive a document as the lawyers, and there could hardly be any question involved which another engineer could not understand for the purpose of making a fair decision. A suit at law is not the most satisfactory way to settle a dispute which really hinges on the question: "Was the work done as it was intended and represented in the contract?" Lawyers naturally look for legal points of attack and defense, and many a case has been decided on a purely legal technicality far beside the equity of the suit.

This arbitration question has been tried out in many forms and unfortunately no method has yet been adopted that seems satisfactory. The Rapid Transit Commission

in New York City some years ago provided that an appeal from the chief engineer's decision should be submitted to a board consisting of one arbitrator chosen by the commission and one by the contractor, and on the failure of these two to agree, a third was to be appointed. It is obvious that the decision thus really lay with the third man, and it would seem a short-cut to name the third man first. Mr. Onward Bates in a very able paper before your congress at Richmond last fall pointed out this very difficulty, and after several years trial by the old Rapid Transit Commission and the present Public Service Commission, the scheme of arbitration has been dropped since it proved quite as costly and consumed as much time, if not more, than the regular court procedure. It would seem that the single arbitration is the solution of the difficulty, and this scheme is concurred in by the National Federation of Building Trades Employers of Great Britain which recently prevailed upon the council of the Institution of Municipal and County Engineers to adopt a modification of the clause regarding the engineer as the sole arbiter of disputes. The council recommended the adoption of a clause submitting the dispute to a single arbitrator to be appointed by the president of the institution, the award of such arbitrator to be final and binding upon the parties. The nature of the questions to be submitted for arbitration is to be confined to the interpretation of the contract or any matter arising thereunder—but not on decisions as to the quantity and fitness of the work—and also as to the withholding by the engineer of any certificates to which the contractor may claim to be entitled. The arbitration is not to apply to any contract amounting to less than \$5,000 and no question involving a sum less than \$250 shall be submitted. We believe that some such measure might well be considered by our public officials. It would minimize litigation and thus remove one of the greatest sources of friction between contractors and public officials.

The attempt to regulate these relations and to prescribe by statute for nearly every contingency that may arise in a contract is, in our judgment, a mistake. Laws are no stronger than the men who enforce them, and if it be the fact that laws are necessary to curb our public officials, something is radically wrong with our system of government. You can't legislate honesty into a man—you may render him more cautious, but if he be dishonest he will circumvent any law made. What we need are better men, not more laws, and public office should offer the best men suitable compensation for their services to the public.

This subject is one that cannot adequately be discussed in a short time; so much depends on the relations of the contractor and the public official—the success of the smallest undertaking. Reduce them to a minimum—cut out all relations with the political official—divorce contracts from politics—and the millennium will be at hand.

To Designate French Roads by Numbers

It is reported that as the result of a petition which has been circulated in France, asking that automobile travel through that country be simplified by the numbering of all the roads, it is quite likely that this system will be in general use within a short time. President Fallieres is stated to have been the first signer of the petition.

According to the plans of the promoters, all the roads in the country will be divided into four classes, national, departmental, those of main communication and those of common entry. Mile stones along the way, instead of bearing the names of nearest towns, will be marked with initials, showing to which class the road belongs, and the number of the road itself in large figures. These figures will also be put up conspicuously along the route wherever needed.

The Work of the Army in the Construction and Maintenance of Roads*

By COL. SPENCER COSBY, G. E., U. S. A.†

It is a well-known saying that an army marches on its stomach, but it is perhaps not so generally recognized by the layman that the keeping of that stomach in a proper condition for marching—in other words, the keeping up of the efficiency of the army—is largely a question of roads. It is indeed possible for troops to march through a country without roads, through dense forests, across bridgeless streams, over pathless mountains, and small bodies of troops have many times been compelled to overcome just such natural obstacles. So great, however, is the difficulty of supply in such cases that a campaign in a section without roads is never undertaken unless there is no other way of achieving the result sought or unless the advantages to be gained are enormous; even then, if the body of troops to be moved is large, or if the results of the campaign are to be lasting, the building of roads will be one of its most important features.

In the case of great wars, however, which are usually carried on in civilized lands, the roads are one of the most important of all the factors to be considered, and no one is more interested than the soldier in the maintenance of good roads throughout the country. In these modern days the railroads, as the main arteries of supply and transportation, are the first roads to be taken into account, but the country highways and byways in the actual field of operations have lost none of their old-time importance. The leaders of the army must have a thorough knowledge of every one of them, while the engineers of the army must be ready to open up roads that the passage of the army or the operations of the enemy have rendered impassable; to maintain the good roads in good condition; to improve the bad roads, and to build new roads if necessary.

Military Roads in Other Lands.—From the earliest times the soldier has been intimately associated with the making of roads. The schoolboy still struggles with the description of the roads built by the armies of Xerxes and Hannibal. The famous old paved Roman roads, remains of which are today found in many parts of Europe, some still in use, were essentially military roads, while the greatest soldier of modern times, Napoleon, was also one of the greatest road builders. He it is that France has to thank for its system of magnificent highways, which were built for military purposes and are still kept up by the government largely with this end in view.

In our country, however, the army has been concerned not only with the construction and maintenance of roads as a military necessity—and we all know of its struggles with the fearful dirt roads of old Virginia during the Civil War—but it has had and still has much to do with the building and upkeep of roads not strictly military in many parts of the United States and its recently acquired outlying possessions. During the early days of the Republic the graduates of West Point were, except for a few foreign engineers, practically the only men in the country who had a thorough technical training. They not only surveyed and mapped a large part of the unexplored West, but laid out and built most of the first railroads in this country as well as in Russia, Cuba and Mexico. It was but natural that they should be largely employed in such work

of road building as was engaged in by the general government. Most of the members and assistants of the Board of Engineers, created by act of Congress in 1824, were army officers; one of the chief duties of this board was the making of surveys, plans and estimates for such roads as the President might "deem of national importance in a commercial or military point of view, or necessary for the transportation of the public mail." The board was placed under the engineer department of the army.

The question of the constitutional power of the government to build roads and of the general policy to be pursued in this respect was one of the burning questions of the day between 1805 and the end of the thirties; it was the subject of many congressional reports, of at least three presidential vetoes, of several presidential messages, and of important judicial decisions. Since the last large appropriation for the Cumberland Road was made in 1838, the government has practically confined its road building in the United States proper to military roads and those built on land under the control of the government.

The Cumberland Road.—In 1806 the government undertook the construction of the famous "Old National" or Cumberland Road, as it came to be known. It was originally intended to extend from tidewater at the Atlantic Ocean to the Ohio River, but it went much further; it was actually completed from Cumberland, Md., through the states of Maryland, Pennsylvania, West Virginia and Ohio, to Springfield, O., and partly built from there to Vandalia, Ill., a total distance of 591 miles. Subsequently it was donated to the states through which it passes. Congress appropriated in all nearly \$700,000,000 for its construction and maintenance, and the services of many graduates of the Military Academy were employed in the work. The roadbed was cleared over a width of 80 ft., but only 30 ft. of this was covered with stone. It was the longest stone road ever built by our government; in fact, I know of no longer stretch of metaled road built by a single agency in the United States.

The work of clearing the ground for the road actually began in 1808, but the first contract for construction was not let until 1811. The eastern section was built under direction of the Treasury Department at a cost of \$1,702,000. In 1824 the practice was begun of using military experts in the construction of the road, which was formally placed under the direction of the War Department in 1827. This department continued in control until the last section of the road was surrendered to the individual states in 1856. It was soon after the army took charge that the macadam system was regularly and scientifically adopted for the construction and repair of the road. Prior to that time it had been built by digging a trench, so as to sink the bed below the natural surface of the ground; this trench was filled with large stones, these were covered with stones of a smaller size, and these in turn with gravel. This system made drainage difficult, and the road deteriorated rapidly. In a report made in 1832 the old Maryland section of the road is stated to be "in a shocking condition," some of it "almost impassable." The road was rebuilt by macadamizing it over the old bed, great attention being paid to the proper location and construction of ditches and culverts.

The Cumberland Road, as finally completed by the army

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engineers, exemplified the application of the best principles of road building known in its day and was the most important, as well as one of the first modern roads in this country. It represented a big advance over the methods used in constructing the early state turnpikes, on which many millions had been expended. The road with its ponderous stone bridges and culverts is still in use, and it is said that in many places the old macadamized bed is still doing duty.

Other Government Roads.—While the Cumberland Road was building, the army was engaged in the construction of many military roads in the West and South, chiefly for the purpose of enabling supplies to be hauled by wagon to the advanced military posts. Many of these roads were built by the troops themselves under the direction of their officers, and were generally constructed in the simplest possible manner that would permit the passage of the rough wagons of the day. As the country became settled, the traffic over many of these highways became so heavy that in parts, at least, they were improved both as to location and character of road surface. Examples of these early military roads are that from Detroit, Mich., to the Maumee River, built by Major John Anderson in 1817; the military road from the Tennessee River to New Orleans, begun in 1816; the military road through Mississippi, built in 1819-20; the roads in Florida to St. Augustine, and from the Georgia state line to Smyrna, Fla., constructed between 1824 and 1830, and those in Arkansas to Little Rock, and from Fort Leavenworth, Kan., to Fort Smith, Ark., built by the infantry in 1837-38.

From 1824 to 1838 congress made extensive appropriations for roads in various parts of the United States, and after 1838 a few small appropriations were made from time to time. All these roads were built under the direction of the army. At first they were constructed partly by the Quartermaster's Department, and partly by the Engineer Department, but after a few years all road work except at army posts was transferred to the engineers. The nature of these early roads can be imagined from the fact that in December, 1828, the Quartermaster-General reported to Congress that in the preceding 4½ years his department had completed 1,456 miles of roads in Florida, Georgia, Arkansas and Louisiana at a total cost of \$77,077—not quite \$54 a mile. Some of these roads must have been wonders, as for instance the one reported completed from Pensacola, Fla., to Fort Mitchell, Ga., 233 miles, at an expense of \$1,138; almost \$5 a mile. I can find nothing done by the engineers to equal this record, though they do report a road built in New Mexico, 300 miles long, at a cost of \$40 a mile. The employment of troops in the construction undoubtedly cut down the cost in many cases. The most important road built by the Quartermaster's Department was apparently a military road in the north-eastern part of Maine, 95 miles long, built between 1828 and 1834, at a cost of \$137,000.

The roads built by the Engineer Department were mostly of a primitive character. Prior to 1860 the number of roads reported as having been surveyed and constructed, improved or completed by them was 57, having an aggregate length of 6,583 miles and costing in all \$1,920,000, thus averaging a little over \$291 per mile. These roads were built in the states of Alabama, Arkansas, Florida, Idaho, Iowa, Indiana, Illinois, Kansas, Michigan, Minnesota, Montana, Nebraska, New Mexico, Oregon, Washington and Wisconsin. The most important were the road which was to run from Memphis to Little Rock, and which was actually constructed as far as the St. Francis River at a cost of over \$6,000 a mile; the road from Detroit to Chicago, 263 miles, costing \$88,900; a road from Point Douglass to the mouth of the St. Louis River, to connect the head of navigation of the Mississippi River with Lake

Superior, 173½ miles, costing \$120,600; from Omaha to Ft. Kearney, Neb., 168 miles, costing \$50,000; from Santa Fe to Taos, N. M., 73 miles, costing \$51,000; from Scottsburg to Myrtle Creek and Camp Stuart, Ore., 160 miles, costing \$109,300, and the Mullan Road, from Fort Benton, on the Missouri River, in Montana, to Walla Walla, Wash., 624 miles, costing \$200,000.

The 57 roads just mentioned do not include the Cumberland Road, on which the government spent an average of over \$10,000 per mile, nor the trail opened by the engineers in 1854 from Salt Lake City to the eastern boundary of California, a distance of over 600 miles, at a cost of \$25,000.

Of the 57 roads built by the army engineers, some were purely military in character and others partly so, but many were intended to open up communication with newly developed territory, to induce the sale of public lands and to facilitate emigration and the transportation of the mails. None of these roads, with possibly one exception was, I believe, metaled. The character of the construction is indicated in the following extract from a report made in 1840 by the Chief Engineer in charge of the works:

"I have not considered the obligation of the government in reference to these roads, to involve more than what is understood by the 'opening' of a road, or the construction of one on the most simple principles; that is, that the timber should be cut down and removed, the undergrowth grubbed up and removed, ditches dug on the sides of the road where required, swamps made passable by the customary log structures, and bridges thrown over streams that are not conveniently fordable, leaving all artificial structures of a roadbed to the future efforts of the local authorities, or to positive legal enactments by the general government."

The Old Santa Fe Trail.—Another famous highway with which the army was long and intimately associated was the old Santa Fe Trail, extending from Fort Leavenworth, Kan., to Santa Fe, N. M. In its palmy days the travel over it was large and important, but as far as I have been able to ascertain, no great amount of road work was done upon it by the army or anyone else. Travelers were far more concerned with the ever-present danger of attack by Indians than with the condition of the roadbed, and to guard and defend travel on the old trail was long one of the arduous duties of our army in the West. The main line of the Atchison, Topeka and Santa Fe Railroad closely follows the old trail in many places.

Wayne's Trace.—Many thousands of miles of the main highways in the fertile states west of the Ohio are, so to speak, the lineal descendants of the trails and roads first broken through the wilderness by the army in its numerous explorations and in its expeditions against hostile Indians. The precursor of all these was the road known as Wayne's Trace, cut by General Anthony Wayne through the forests of Ohio and Indiana during his Indian campaign of 1794. It began at what is now called, I believe, "Mad Anthony Street," in Cincinnati, and extended northward through the present towns of Hamilton, Greenville, Fort Recovery and Defiance, to Maumee, where the decisive victory of Fallen Timber was won. From there the road was extended to Fort Wayne, named in honor of the victorious general.

Explorations.—The earliest knowledge of much of our western country and the location of the first routes of travel were largely the result of military explorations and reconnaissance work from 1800 to 1830. Some of the most notable expeditions were those of Captains Lewis and Clarke, 1804-6, to the sources of the Missouri and down the Columbia to its mouth; of Lieut. Pike, 1805-7, to the sources of the Mississippi and Arkansas; of Capt. Bonneville, 1832-6, to Great Salt Lake and the region west of the Rocky Mountains; and of Capt. J. C. Fremont, 1842-6,

during which he mapped the road from the Missouri River to Oregon, and explored upper California and Oregon. From 1845 to 1861 many other army officers were detailed to continue these explorations and to locate military roads in the western wilds. Among the officers actively engaged in this work were Lieut.-Col. Joseph E. Johnston, Capt. George B. McClellan, and Lieut. G. K. Warren, who a few years later became distinguished generals in the Civil War.

During that war the engineer troops were, among other duties, extensively employed in building and repairing roads in connection with the campaign in Virginia. The usual method of repairing the old dirt roads in important cases was to corduroy them. This generally consisted of laying a number of stout timbers lengthwise and placing transversely over them saplings from 4 to 6 ins. in diameter, tied down by side rails, which were in turn anchored by pickets. Many hundreds of miles of these roads were built during the war.

As soon as the war was over the army resumed, on a more extensive scale than ever, its work of exploration and of survey in the West. In addition to the many large expeditions sent out, small detachments of engineer troops were employed on reconnaissance work throughout the West under the direction of engineer officers. It is recorded in the annual report of the Chief of Engineers for 1876 that the enlisted men in the West during three years reconnoitered and mapped 24,044 miles of routes traversed by scouting parties and expeditions against hostile Indians.

Roads in National Parks.—In the numerous areas of land owned by the government throughout the United States, such as military posts and reservations, national cemeteries, sites of river and harbor works and national parks, the army has built hundreds of miles of good roads. The most extensive of these systems is probably that in Yellowstone National Park, comprising a total mileage of some 345 miles. These roads were built by the army engineers, who spent about \$2,000,000 in their construction, maintenance and repair. Most of the roads are metaled, and though they cannot be considered as roads of the first class as yet, they are fully as good as the amounts appropriated by Congress (averaging about \$3,000 per mile for construction) would permit. They are well located and well drained, and many great natural obstacles have been overcome in building them through a difficult mountain region. Plans and estimates have been prepared by the War Department for the improvement of these roads in accordance with the best principles of modern practice as soon as Congress provides the necessary funds. A road 25 miles long has been built by the army engineers in the last eight years leading into the Mount Rainier National Park at a cost of about \$250,000.

Roads in the District of Columbia.—Since 1874 all street and road work in the District of Columbia has been under the charge of officers of the Corps of Engineers. The present condition of the city streets and suburban and park roads gives evidence of the faithfulness with which this charge has been exercised.

Army Road Building in Other Lands.—A description of the road building activities of our army would not be complete without a brief reference to the work done by it in recent years in lands beyond the seas.

Cuba.—During the period of the first American intervention in Cuba, just after the Spanish War, the road work under the army was confined chiefly to making passable the existing roads and bridges which had suffered severely during the preceding years of revolution.

At the time of the second military occupation of Cuba, the Americans found only 380 miles of improved roads in an island, the area of which is 41,000 square miles. The adjacent island of Jamaica, one-fifth the size, had over 6,000 miles of such roads. The unimproved roads in Cuba

hardly deserved the name. Transportation over them was costly and slow, being carried on by means of pack trains and two-wheeled carts, and the latter often found the roads impassable. In the two years of American intervention, from 1907 to 1909, in addition to extensive repairs made to the existing roads, over 460 miles of new roads were either completed or well advanced toward completion. This work was done under the Department of Public Works, at the head of which was an engineer officer of the United States Army, and some of it was done under the direct charge of engineer troops. The roads were all macadamized for a width of 16 ft. and given a maximum grade of 6 per cent.

The Philippines.—During the first two years of their occupation of the Philippines the Americans had their hands full in fighting the insurgents, but even then the army did considerable work in the repair and maintenance of roads and bridges in the course of its operations. In 1900, however, before the fighting was fully over, detachments of engineer troops were sent to various parts of the islands, charged with the repair of roads and bridges. The number of these detachments was increased during the following year and many hundreds of miles of roads were repaired, and in numbers of cases entirely rebuilt. During the course of this work one officer was killed and one captured by the insurgents.

The first act passed by the United States Philippines Commission appropriated \$1,000,000 from insular funds for the repair of roads and bridges. This work was placed under the army engineers. Other large appropriations were subsequently made, and much of the work, especially in the beginning, was executed under the direction of army officers. Even now they still have charge of the work in the Moro Province.

Porto Rico.—During the nearly four centuries of Spanish rule in Porto Rico, only 158 miles of permanent roads had been constructed in the island. During the two years of American military government immediately following the war \$155,000 was spent in the repair and maintenance of these old roads, and about \$1,500,000 was expended or contracted for in the construction of 123 miles of new roads.

Alaska.—It is a long leap from the tropics to Alaska, but there too our army has in recent years been actively engaged in road building. Congress has placed "the location, laying out, construction and maintenance" of roads in the territory under a board of three army officers. Their last report showed 800 miles of wagon roads, 534 miles of winter sled roads, and 1,100 miles of trails constructed. The best of these, the wagon roads, are in the main only dirt roads, but they are serving well their purposes of rendering habitable a vast country hitherto almost inaccessible.

In the limited time available for the preparation of this paper, I feel that I have not been able to do full justice to the subject, and some inaccuracies may have crept in, though most of my statements are based on official records.

While the army has always kept in touch with the most approved methods of road construction and has done its share towards the development of these methods, the most notable road work of the army has been that of the pioneer in the vanguard of civilization, exploring and opening up routes where no roads existed, making possible the advance into the wilderness of the great army of settlers. They and their sons converted the rough early trails into the roads of today and multiplied them exceedingly. It is for us, their grandsons, to continue worthily the work they began, to convert our heritage of rough country roads into a nation-wide system of modern highways, fully equal to those in older lands and capable of carrying in all weathers, quickly and at little cost, the rapidly increasing traffic that is pouring over them.

Highway Engineering Course at Columbia University

Work in the graduate highway engineering course at Columbia University, New York City, began on Wednesday, December 4. Some changes in arrangement of schedule have been made for the coming academic year, and these, together with a list of the non-resident lecturers for the year and a general description of the courses are given in an announcement issued last month by the university.

As most readers of "Good Roads" know, the course in highway engineering at Columbia University is a graduate course arranged with especial reference to the needs and convenience of men actively engaged in highway engineering work. It is open to anyone holding a bachelor's degree in civil engineering from an institution in good standing or to anyone having equivalent training. In order to enable engineers to take advantage of the course, it is given only during the months from December to March, inclusive—the period during which, as a rule, those employed in highway work are least busy. The course leads to the degree of Master of Arts, and since the work of each calendar year is equivalent to only a half-year, attendance for two years is required to obtain the degree.

The changes made this year, to which reference has already been made, are described in a paper on highway engineering education by Arthur H. Blanchard, Professor of Highway Engineering at Columbia, which is printed on page 247 of this issue. The schedule for the year's work, with the various subdivisions of the course arranged chronologically, so far as possible, instead of as given in the bulletin, is as follows:

Dec. 4-16, 1912.—Highway Bridges and Culverts (105). Lectures and problems in design work; 7:30-9:30 p. m., Mon., Wed. and Fri. Professor Burr and Mr. Drowne.

Dec. 4, 1912-Mar. 19, 1913.—Seminar in Highway Engineering Literature (112). Reading and conferences; 10:10 a. m.-12:00 m., Wed. Professor Blanchard.

Dec. 4, 1912-Mar. 21, 1913.—Engineering Geology (H215). Lectures, laboratory and field work; 9:10-10:00 a. m., Mon., Wed. and Fri. Professors Kemp and Berkey.

Dec. 5-19, 1912, and Feb. 6-13, 1913.—Non-Bituminous Road Materials; Laboratory Course (108). 10:10 a. m.-5:00 p. m., Mon., Tues. and Thurs. Mr. Drowne.

Dec. 5, 1912-Mar. 20, 1913.—Lithology and Petrology (H216). Lectures and laboratory work; 9:10-10:00 a. m., Tues. and Thurs. Professors Kemp and Berkey.

Dec. 6, 1912-Mar. 21, 1913.—Seminar in Highway Engineering Literature (111). Reading and conferences; 10:10 a. m.-12:00 m., Fri. Professor Blanchard.

Dec. 20, 1912-Jan. 4, 1913.—Street Surveying and Design (110). Lectures, inspection trips and design work; 9:00 a. m.-4:00 p. m., Mon., Tues., Wed., Thurs., Fri. and Sat. Mr. Drowne.

Dec. 20, 1912-Jan. 4, 1913. Manufacture and Testing of Bituminous Materials (H199). Lectures, demonstrations and seminars; 9:00 a. m.-4:00 p. m., Mon., Tues., Wed., Thurs., Fri. and Sat. Mr. Hubbard.

Jan. 6-21, 1913.—Bituminous Surfaces and Bituminous Pavements (103). Lectures, inspection trips and reports; 7:30-10:30 p. m., Mon., Tues., Wed., Thurs. and Fri. Professor Blanchard.

Jan. 6-21, 1913.—Highway Jurisprudence, Highway Laws and Systems of Administration (104). Lectures, reading and conferences; 2:00-5:00 p. m., Mon., Tues. and Thurs. Professor Blanchard.

Jan. 22-Feb. 4, 1913.—Road Surveying and Design (109). Lectures, inspection trips and design work; 9:00 a. m.-4:00 p. m., Mon., Tues., Wed., Thurs., Fri. and Sat. Mr. Drowne.

Jan. 22-Feb. 4, 1913.—Testing of Bituminous Materials; Laboratory Course (H200). Lectures and laboratory work; 9:00 a. m.-4:00 p. m., Mon., Tues., Wed., Thurs., Fri. and Sat. Mr. Hubbard.

Feb. 5-21, 1913.—Mechanical Appliances Used in Highway Engineering (107). Lectures, inspection trips and reports; 7:30-10:30 p. m., Mon., Wed. and Fri. Mr. Drowne.

Feb. 17-27, 1913.—Management Engineering (106). Lectures; 2:00-4:00 p. m., Mon., Tues. and Thurs. Mr. Drowne.

Feb. 24-Mar. 21, 1913.—Economics and Design of Roads and Pavements (101). Lectures; 2:00-4:00 p. m., Mon., Wed. and Fri. Professor Blanchard.

Feb. 28-Mar. 19, 1913.—Macadam and Other Roads; Brick.

Stone Block, Wood Block and Cement Concrete Pavements (102). Lectures, inspection trips and reports; 7:30-10:30 p. m., Mon., Tues., Wed. and Fri. Professor Blanchard.

By reference to the above, it will be noted that highway engineering 102, 103, 105 and 107 are to be given at evening sessions.

What is termed the unified graduate course in highway engineering comprises a major in highway engineering consisting of courses 101, 102, 103, 104, 111 and 112; a minor in highway engineering consisting of courses 105, 106, 107, 108, 109 and 110, and a minor in the allied special courses, consisting of chemistry, H199 and H200, and geology, H215 and H216.

Engineers desiring to take certain courses without matriculating for a degree may do so with the permission of the Dean of the Faculty of Pure Science. This arrangement has been made to make it possible for engineers unable to secure sufficiently long leaves of absence for the completion of the full course to take such special courses as they may desire, and facilities for so doing have been provided by concentrating the work of all of the courses except highway engineering 111 and 112 and geology H215 and H216 in short periods instead of extending them over the entire four months.

The officers of instruction for the year are as follows: James Furman Kemp, A.B., Sc.D., E.M., Professor of Geology; William H. Burr, C.E., Professor of Civil Engineering; Charles P. Berkey, B.S., M.S., Assistant Professor of Geology; Milton C. Whitaker, B.S., M.S., Professor of Engineering Chemistry; Arthur H. Blanchard, C. E., A.M., Professor of Highway Engineering; James S. MacGregor, B.S., M.S., Instructor in Civil Engineering; Henry B. Drowne, C. E., Instructor in Highway Engineering; Prevost Hubbard, Lecturer in Engineering Chemistry; Emma D. Lee, A.B., Librarian of the Davis Library of Highway Engineering.

Non-resident lecturers for 1912-13 are: John A. Benschel, M.E., New York State Engineer, Albany, N. Y.; William H. Connell, Chief, Bureau of Highways and Street Cleaning, Philadelphia, Pa.; Morris L. Cooke, M.E., Director, Department of Public Works, Philadelphia, Pa.; C. A. Crane, Secretary, General Contractors' Association, New York City; Walter W. Crosby, C.E., D.Sc., Chief Engineer of the Maryland Geological Survey and Consulting Engineer, Baltimore, Md.; Charles Henry Davis, C.E., President, National Highways Association, South Yarmouth, Mass.; A. W. Dow, Ph. B., Chemical and Consulting Paving Engineer, New York City; Walter H. Fulweiler, B.Sc., Engineer, Research Department, United Gas Improvement Co., Philadelphia, Pa.; John M. Goodell, B.Sc. in C.E., Editor-in-Chief "Engineering Record," New York City; D. L. Hough, Ph.B.; President United Engineering & Contracting Co., New York City; Arthur N. Johnson, S.B., State Highway Engineer, Springfield, Ill.; Nelson P. Lewis, A.B., C.E., Chief Engineer, Board of Estimate and Apportionment, New York City; J. C. Nagle, A.M., M.C.E., Professor of Civil Engineering and Dean of the School of Engineering, Agricultural and Mechanical College of Texas, Houston, Texas; Harold Parker, First Vice President, Hassam Paving Co., Worcester, Mass.; H. B. Pullar, Assistant Manager and Chief Chemist, American Asphaltum & Rubber Co., Chicago, Ill.; J. M. F. de Paligny, A.B., B.S., Ingenieur en Chef des Ponts et Chaussées, et Directeur, Mission Française d'Ingénieurs aux États-Unis, New York City; John R. Rablin, Chief Engineer, Massachusetts Metropolitan Park Commission, Boston, Mass.; Clifford Richardson, A.B., Consulting Engineer, New York City; Philip P. Sharples, A.B., Chief Chemist, Barrett Mfg. Co., Boston, Mass.; Francis P. Smith, Ph.B., Chemical and Consulting Paving Engineer, New York City; Albert Sommer, D.Eng., Consulting Chemist, New York City; Geo. W. Tillson, C.E., Consulting Engineer, Borough of Brooklyn, New York City.

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EDUCATION AND TRAINING FOR HIGHWAY ENGINEERING

During the past few years much attention has been given to the education and training of young men for the work of highway engineering. An alleged lack of competent highway engineers has been a favorite theme with the so-called good roads enthusiasts, and the establishment of chairs of highway engineering in educational institutions of various kinds has been extensively advocated. In addition, serious attention has been given the matter by prominent educators and engineers, and considerable progress has been made in putting into practice different theories.

On other pages of this issue we print an article entitled "Highway Engineering Education," which is of particular interest because it not only discusses the problem in the abstract, but also describes one plan adopted for its solution. The article in question is a paper delivered at the Atlantic City road congress by Professor Arthur H. Blanchard of Columbia University, who has had excellent opportunities for studying the problem—first in actual practice where he came in contact with recent engineering graduates

and had an opportunity to observe their work in his department, and later as the head of the postgraduate course in highway engineering at Columbia.

The alleged dearth of technically trained engineers qualified to take up highway work, and the problem of providing the proper technical training for such work, are so closely related that it is difficult to discuss one without also taking the other into account. Hence, before calling attention to some points in connection with the amount and kind of technical training necessary for the highway engineer, it is advisable to examine briefly the oft-repeated statement that there are not enough highway engineers.

There is really no lack of engineers fully as well equipped to take up highway work as any other branch of civil engineering, but there probably is a lack of engineers who are inclined to enter such work—first because of the low salaries almost invariably paid, and, second, because of the uncertainty of continuous employment. The reasons for these two conditions have no particular bearing on the question of what should be the education and training of the student, and so need not be considered here.

Hitherto, highway engineering may not have been regarded as on a par with other branches of the profession of civil engineering; but because of changes in traffic conditions, the introduction of new materials of construction, the amount of road to be built and the necessity for the most efficient utilization of the available funds, road work now requires engineering skill of a high order. Those qualified to judge have never contended that an engineer engaged in any particular branch of his profession needed only the specialized knowledge of that particular branch. Granting, then, that highway engineering may be put on the same plane as other special branches of engineering, it follows logically that those practicing it should have the same kind of training—in other words, that the broad educational foundation provided by the usual four-year undergraduate course in civil engineering is as essential for the highway engineer as for the railroad engineer, the bridge engineer or any other specialist.

The attempt to confine the education of the future highway engineer to the study of those particular subjects bearing most directly upon his work—in other words, overspecialization in an undergraduate course—has two very undesirable results. The first of these is its inevitable narrowing and circumscribing effects. Specialization on highway engineering in a civil engineering course, if carried to the extent which would be necessary were the student to be given as thorough an educational equipment as the time allotted to his course allowed, would render him unfit to enter any other field of engineering upon graduation. This would be a most serious handicap to a graduate, for most students in engineering schools go through the four years of undergraduate study with no very definite idea of what line of work they will finally pursue. The chief desire of most of them is to get work as soon as possible, and, as a rule, they are glad to take the first opportunity that presents itself within the limits of a not very sharply defined field. Cases where the opposite is true do occur, of course, but they are exceptional.

The second evil of too much specialization in undergraduate courses is that the study of the special subjects necessarily displaces to a greater or lesser extent other studies bearing less directly upon the anticipated line of work, but which are, nevertheless, essential to a proper training for the practice of any branch of engineering. In the four years usually allotted to an undergraduate course in civil engineering, there is none too much time for the mastery of the more or less general subjects requisite for a well-balanced engineering education, as may be demonstrated by a study of the curriculum of any leading technical school, and it is difficult to find subjects which could well be omitted to allow for special work.

Bearing in mind the foregoing, it should be obvious that it is unwise to attempt to substitute the narrow education necessary to turn out a specialist in highway engineering for the broad education afforded by the usual four-year engineering course, especially since a graduate from the latter could take up highway engineering as successfully as thousands of such graduates take up other branches of engineering. At the same time, special training within reasonable limits is as desirable for those who are reasonably sure of becoming highway engineers as it is for those who have similar plans in regard to any other branch. Modern road construction requires a more or less thorough knowledge of several subjects not ordinarily included in the regular civil engineering course, and it is also desirable that the highway engineer have a more extensive knowledge of certain subjects that are included in the regular course than it is possible for him to acquire in the brief time allotted to them. Now that bituminous materials have so important a place in road construction and maintenance, this is especially true in regard to chemistry; and the same may be said of several other subjects.

If it is possible for the engineer who is engaged in highway work, or the student who knows that he will be engaged in such work, to secure special training, he will, of course, gain immeasurably by so doing. In the case of the student it is quite possible that the desired result can be secured by modifying the undergraduate course, but such modification should be made with caution, bearing in mind the dangers of over-specialization, as pointed out. In other branches of engineering, such training as this is usually secured by means of a postgraduate course, and such a course would seem the most logical for the training of the highway engineer.

Postgraduate courses of highway engineering can be arranged in various ways. Where possible, the usual one-year or two-year period of resident study at the university or technical school will, perhaps, give the best results. The average engineer, however, can afford neither the time nor the money for such study and could probably better take advantage of an arrangement similar to that at Columbia University, which is explained at some length in Professor Blanchard's paper.

But whatever measures are taken by educators to provide better facilities for the training of highway engineers, it should be remembered that the surest way to overcome the lack of available engineers properly trained for highway work is to put that work on such a basis as regards salary and tenure of office that the technical graduate will find it as attractive as the drafting room of a steel company, the engineering department of a railroad or any of the many other positions that are open to him.

SELECTING AN ECONOMICAL PAVEMENT

To many engineers the most interesting portion of the first article in this number will probably be the review of the report of the Bureau of Municipal Research of Cincinnati on the selection of pavements. That report takes up the general question of the selection of pavements, but deals particularly with selection with reference to the matter of economy.

Of all the questions that arise, from the time it is decided to pave a street to the opening of the new pavement to traffic, few are of greater importance than the question of what pavement to use, for an unwise choice of pavement will often result in as much future dissatisfaction as improper construction. While perhaps not so much technical knowledge is necessary to determine what pavement best meets all the requirements of a particular case as is required to construct a first-class pavement, yet fully as much judgment or common sense is necessary in the selection as in the subsequent construction.

The selection, so far as it is determined by considera-

tions of economy, can be made with very nearly absolute certainty provided certain data may be had. Of what factors such data are made up is set forth in the article referred to and need not be repeated here. It is unfortunate, as pointed out in that article, that in a great many cases records providing the requisite data are not available for the reason that the systematic keeping of costs has not been as common in the past as it should have been. The ideal situation would obtain in a city where, for a period sufficiently long to cover the life of each particular kind of pavement under consideration, a complete history had been kept of each paved street, such history including dates of paving, complete cost data on all work, with sufficient data on current prices at the time the work was done to make the main costs intelligible, complete traffic records, and, in short, every note which might throw light on the conditions obtaining throughout the life of the pavement, its action in service, and every item of expense connected with its construction, repair, maintenance or reconstruction. Such conditions, of course, do not exist, but, at the same time, there is always available a considerable amount of data which can be utilized provided it be made use of with due regard to its limitations and with proper allowances for differences in locality, time, and such other influences as may be known or suspected. An example of the discriminating use of such incomplete data is furnished by the report under consideration.

The actual figures as to costs and the conclusions arrived at in the case of Cincinnati are of minor importance—it is the method that is of interest. The same procedure would lead to equally sound conclusions in any other locality, provided equally wise use were made of the available local data, and it is only by taking into account the various factors shown to influence the choice that intelligent selection of a pavement for a given case can be made.

Though the selection of pavement is a matter requiring the most careful consideration and a matter which should be in the hands of properly chosen officials, it is a fact that in too many cases the selection is made neither by the use of good judgment nor by competent persons. Such selection is distinctly an engineering problem and is one which should be solved by engineers with reference only to selecting a pavement which will most satisfactorily and economically meet the requirements imposed by the particular conditions under which it is to be used. Neither the whims of the owners of abutting property nor the questionable partiality of powerful city officials should influence it to any degree. It is natural, of course, that the residents of a street should take a lively interest in the material with which that street is to be paved and it is inevitable that they will exert the greatest pressure which they can bring to bear to secure the particular pavement which they may desire. Moreover, it is only right that their preference be given consideration. At the same time, the community at large must be considered, and the cases are not infrequent in which the common good should take precedence over individual benefits. In such cases especially, the matter of selection should rest in competent hands, safely removed from the danger of undue influence.

Of the \$7,000,000 municipal loan authorized by the voters at the recent election in Philadelphia, Pa., the Bureau of Highways will receive the sum of \$1,750,000. This is to be divided as follows: For grading streets, \$600,000; for paving intersections and in front of unassessable property, \$150,000; resurfacing asphalt streets, \$500,000; improving country roads, \$300,000; repairs to streets, \$200,000.

The University of Michigan has installed a road material testing laboratory in connection with its department of engineering. The laboratory cost \$2,000 and includes among other equipment a standard brick rattler and machines for testing cement and paving stones.

Service Test Roadway in Philadelphia, Pa.

Details of the different materials and methods of construction to be employed in the building of the test roadway on one of the main trunk lines leading out from Philadelphia toward New York have recently been furnished by Wm. H. Co-nell, Chief of the Bureau of Highways and Street Cleaning of Philadelphia. Mention of this work has been made in previous issues of "Good Roads." (See "Report on Street Paving in Philadelphia," "Good Roads," Sept. 21, 1912, p. 125, and "Philadelphia Plans Test for Roadways," "Good Roads," May 25, 1912, p. 304.)

This road, which is now under construction, will eventually consist of 25 sections, having a total length of 14,343 ft. Various pavements will be laid on these different sections, including bituminous pavements built by both the mixing and penetration methods, vitrified brick, concrete and various special pavements.

All bituminous pavements built by the mixing method will be laid on a broken stone foundation, prepared by thoroughly cleaning, spiking up and shaping the old surface, adding sufficient $1\frac{1}{2}$ -in. trap rock to give it the required contour and a thickness of not less than 4 ins., on top of the old foundation, after rolling. After the material for the first course has been properly shaped and rolled, dry trap rock screenings will be spread and thoroughly rolled, with as little water as possible, until well bonded. This course will be filled not quite flush, but will be left with the coarse stones projecting slightly to furnish a better surface on which to put the wearing course.

All bituminous broken stone pavements laid by the penetration method (sections 15, 16, 18, 19, 20, 21, 22 and 23) will be laid on a broken stone foundation, prepared in a similar manner as that for the mixed pavements, with the following exceptions: The $1\frac{1}{2}$ -in. stone will be laid to a depth of not less than 3 ins. over the old foundation, and, after being shaped and rolled, will be covered with trap rock screenings to fill the voids. The surface will then be rolled dry, sprinkled with water, and rolled again. Upon this will be spread a course of $1\frac{1}{2}$ -in. trap rock, passing a 2 $\frac{1}{2}$ -in. screen and retained on a $\frac{3}{4}$ -in. screen, which will be rolled to a depth of 3 ins. Upon this the bituminous binder specified will be spread at a rate of not less than $1\frac{1}{4}$ nor more than $1\frac{1}{2}$ gals. per sq. yd. After the application of the bituminous binder, enough $\frac{3}{4}$ -in. dry trap rock, free from dust, will be spread to just fill the voids and cover the surface, after which the road will be thoroughly rolled until the surface is bonded. The surface will then be swept and from $\frac{1}{2}$ to $\frac{1}{2}$ gal. per sq. yd. of bituminous binder applied. This will be covered immediately with a thin layer of dry trap rock chips, free from dust, and then rolled.

The sections in detail are as follows:

Section 1.—Sta. 0+00 to 10+00.—Bituminous pavement laid in accordance with the so-called Topeka specifications. Mineral aggregate composed of gravel or trap rock screenings and sand, used in the proportions of approximately 3 parts of gravel or screenings to 1 of sand. Mineral aggregate proportioned as follows: Passing 200-mesh screen, 5 to 11 per cent.; passing 40-mesh screen, 18 to 30 per cent.; passing 10-mesh screen, 25 to 55 per cent.; passing 4-mesh screen, 8 to 22 per cent.; passing 2-mesh screen, less than 10 per cent. Finished pavement to contain between 7 and 9 per cent. of bitumen, and to be laid 2 ins. thick after rolling on broken stone base.

Section 2.—Sta. 10+00 to 13+00.—A 5-in. concrete base, 1:3:6 mix, with bituminous top consisting of an application of approximately $\frac{1}{2}$ gal. Pioneer Road Surface Asphalt per sq. yd., covered immediately with a thin layer of trap rock chips passing a $\frac{3}{8}$ -in. screen, and rolled.

Section 3.—Sta. 13+00 to 15+50.—Vitrified block pavement on 4-in. concrete foundation.

Section 4.—Sta. 15+50 to 22+50.—A 5-in. concrete base, 1:3:6 mix, with $\frac{1}{4}$ -in. expansion joints, filled with as-

phaltic cement of a penetration of about 90, at 40-ft. intervals. Section divided into three divisions, each covered with a bituminous top consisting of about $\frac{1}{2}$ gal. per sq. yd. of (1) Ugite, (2) Tarvia A and (3) Texas Road Surface Asphalt, covered with a thin layer of trap rock chips passing $\frac{3}{8}$ -in. screen, and rolled.

Section 5.—Sta. 22+50 to 35+00.—Bituminous pavement known as Filbertine, proportioned as follows: $\frac{3}{4}$ -in. stone, 55 to 65 per cent.; sand coarse to fine, 35 to 45 per cent.; asphaltic cement (35 to 45 per cent., 70 to 80 penetration), 5 to 8 per cent. Laid 2 ins. thick on broken stone base.

Section 6.—Sta. 35+00 to 47+50.—Bituminous pavement with mineral aggregate composed of 2 parts trap rock and 1 part sand and containing at least 5 per cent. of mineral dust. Trap rock to be of approved quality, run of crusher, largest passing $1\frac{1}{4}$ -in. screen; sand to be hard grained and moderately sharp and having at least 25 per cent. of material retained on a 20-mesh screen and 5 per cent. passing an 80-mesh screen. Mineral aggregate to contain from 7 to 9 per cent. of bitumen. Laid to a depth of 2 ins. after rolling, on broken stone base.

Section 7.—Sta. 47+50 to 50+50.—Vitrified block pavement on 4-in. concrete foundation.

Section 8.—Sta. 50+50 to 57+00.—A 5-in. concrete base, 1:3:6 mix, with Dolarway top dressing of approximately $\frac{1}{2}$ gal. bituminous material per sq. yd., covered with dry trap rock chips passing a $\frac{3}{8}$ -in. screen. Concrete base to have $\frac{1}{4}$ -in. transverse expansion joints every 40 ft., filled with an asphaltic cement of about 90 penetration.

Section 9.—Sta. 57+00 to 60+00.—Vitrified block pavement on 4-in. concrete foundation.

Section 10.—Sta. 60+00 to 66+00.—Bituminous pavement, having mineral aggregate composed of $\frac{3}{4}$ -in. trap rock, run of crusher, passing a 1-in. screen and retained on a $\frac{1}{4}$ -in. screen. To contain from 7 to 9 per cent. of bitumen, and to be laid to a depth of 2 ins., after rolling, on a broken stone foundation.

Section 11.—Sta. 66+00 to 72+00.—Bituminous pavement having a mineral aggregate composed of run of bank gravel containing no stone over 1 in. in greatest dimension; material to be sound, hard grained and free from loam and clay. Sand to be clean, hard grained and moderately sharp and of such size that all will pass a 50-mesh sieve, not more than 5 per cent. will pass 200-mesh sieve and not less than 20 per cent. will pass an 80-mesh sieve. Paving mixture to contain sufficient quantity of this sand to give a dense mineral aggregate containing from 7 to 9 per cent. of bitumen. To be laid to a depth of 2 ins., after rolling, on a broken stone base.

Section 12.—Sta. 72+00 to 75+50.—Vitrified block pavement on a 4-in. concrete base.

Section 13.—Sta. 75+50 to 81+00.—A 5-in. Hassam pavement, with bituminous top. Pavement to consist of broken stone evenly spread to such a depth that it will have, when thoroughly compressed, a uniform thickness of 5 ins. Before rolling, to be grouted with a grout consisting of 2 parts sand and 1 or more parts Portland cement, mixed in an especially designed mechanical mixer. Voids to be thoroughly filled with grout and rolled to exclude all air bubbles with a self-propelled roller weighing at least 5 tons. After grout has thoroughly set, to be covered with $\frac{1}{4}$ gal. of tar per sq. yd., over which is to be spread a layer of trap rock chips, free from dust. After rolling, $\frac{1}{4}$ gal. of asphaltic material per sq. yd. to be applied, covered with $\frac{3}{8}$ -in. dry trap rock chips and rolled.

Section 14.—Sta. 81+00 to 84+00.—Vitrified block pavement on 4-in. concrete base.

Section 15.—Sta. 84+00 to 90+00.—Resurfaced by penetration method, using Ugite binder.

Section 16.—Sta. 90+00 to 93+00.—Resurfaced by penetration method, using Byerlite asphalt.

Section 17.—Sta. 93+00 to 96+00.—Vitrified block pavement on 4-in. concrete base.

Section 18.—Sta. 96+00 to 102+00.—Resurfaced by penetration method, using Tarvia X binder.

Section 19.—Sta. 102+00 to 108+00.—Resurfaced by penetration method, using Texas Road Surface Asphalt.

Section 20.—Sta. 108+00 to 114+00.—Resurfaced by the penetration method, using Standard Binder B.

Section 21.—Sta. 114+00 to 120+00.—Resurfaced by the penetration method, using Pioneer Road Surface Asphalt Binder B.

Section 22.—Sta. 120+00 to 126+00.—Resurfaced by the penetration method, using Bermudez Asphalt Binder B.

Section 23.—Sta. 126+00 to 132+00.—Resurfaced by the penetration method, using Sun Hydrolene Asphalt Binder.

Section 24.—Sta. 132+00 to 137+50.—Bicomac pavement, consisting of a 4-in., 1:3:6 concrete base with wearing surface constructed as follows: Concrete base, after being placed and while still wet and in a plastic condition, to be covered with a resilient concrete wearing surface, 1 in. thick after compression. Wearing surface—applied cold—to consist of 1 part Portland cement, 2 parts clean sand or crusher dust, 12 parts clean stone and from 6 to 8 per cent. Headley Good Roads Company's No. 26. The stone to be free from dust and to contain not more than 25 per cent. of $1\frac{1}{2}$ -in. size, the balance to be $\frac{3}{4}$ -in. stone and dustless screenings or gravel of like grading. Bitumen to be so prepared that it will mix with water in any proportion. This compound, known as Bicomac, to be used in the proportions of 50 to 75 per cent. of Bicomac, with 50 to 25 per cent. of water. The mineral aggregate to be thoroughly coated with the solution, the sand and cement to be mixed together and added to the coated stone, and the whole thoroughly saturated with the solution, laid, and rolled.

Section 25.—Sta. 137+50 to 143+43.—Vitrified block pavement on a 4-in. concrete foundation.

BOOK NOTICES

HIGHWAY ENGINEERS' HANDBOOK. By Wilson G. Harger, C.E., Assoc. M. Am. Soc. C. E., First Assistant Engineer, New York State Department of Highways, and Edmund A. Bonney, Chief Draftsman, Division No. 5, New York State Department of Highways. Flexible leather; 4x7 ins.; 493 pp.; illustrated, tables and diagrams; McGraw-Hill Book Co., 239 W. 39th St., New York City. \$3.00.

The purpose of the "Highway Engineers' Handbook," according to the preface of the authors, is "to collect, in a compact and convenient form, information ordinarily required in the field and office practice of road design and construction." It is further stated that the book is designed to meet the requirements of both experienced and inexperienced men.

The book is divided into two parts, the first dealing with the theory of design and the second with the survey, the design, the preparation of estimates and the construction. The chapter titles in Part 1 are as follows: Grades and Alignment, Sections, Drainage, Foundations for Broken Stone Roads, Top Courses, Minor Points, Materials. The chapter headings under Part 2 are: The Survey, Office Practice, Cost Data and Estimates, Notes on Construction, Specifications. Throughout the book, more particularly in Part 2, there are many tables—some of them special tables having particular reference to road work, and the remainder the usual tables of curves, earth work, trigonometrical functions, logarithms, etc.

The discussion of wearing surfaces or top courses, which comprises Chapter 5 of Part 1, is limited to a little over 14 pages. In it are taken up water bound macadam, water bound macadam treated with dust layers or protected by flush coats, bituminous macadam built by the penetration method and the mixing method, natural rock asphalt sur-

faces, various patented bituminous pavements, brick pavements, concrete pavements, Kleinpflaster or Durax, the McCintock cube pavement and locomac.

Chapter 6, which is entitled "Minor Points," takes up the matter of guard rails of both wood and concrete, retaining walls, curbs, road signs, gutters, and the like, and occupies 9 pages.

The first chapter in Part 2, which deals with the making of surveys, discusses the subject in considerable detail, giving minute directions for the keeping of perhaps unusually complete notes. In the same way, the next chapter, on "Office Practice," contains considerable information on mapping and computing.

The discussion of cost data and estimates occupies about 50 pages and deals with the costs of the various items in the construction of different kinds of roads and appurtenant work.

Some of the subheads in the chapter, entitled "Notes on Construction" are: Staking Out, Rough Grading, Fine Grading, Sub-Base, Bottom Stone, Top Course, Brick Roads, and Culverts.

The last chapter deals with specifications and is divided into two parts, one dealing with materials and the other with methods. The matter is taken largely from the specifications of the states of New York and Washington.

A TEXT BOOK ON ROADS AND PAVEMENTS. By Frederick P. Spalding, M. Am. Soc. C. E., Professor of Civil Engineering, University of Missouri, Columbia, Mo. Fourth edition, 1912. Cloth; 12mo, xli + 408 pp.; 51 figures. McGraw-Hill Book Co., 239 W. 39th St., New York City. \$2.00.

By the revision of this book to bring it up to date, its size has been increased by about 20 per cent., the present edition containing 408 pages while the former one contained 340. The chapter on bituminous pavements, occupying 44 pages in the 1908 edition, has been replaced in the 1912 work by two chapters, entitled "Bituminous Macadam Roads" and "Asphalt Pavements," occupying, respectively, 41 and 44 pages. A chapter on concrete pavements, occupying 18 pages, has also been added.

The general character of the book has been very little altered, the changes made being those necessary to bring the former subject matter into accord with present practice.

STREET PAVEMENTS AND PAVING MATERIALS. By Geo. W. Tillson, C.E., M. Am. Soc. C. E. Consulting Engineer to the Borough President, Borough of Brooklyn, New York City. Second edition, 1912. Cloth; 8vo, xli + 651 pp.; 97 figures. John Wiley & Sons, 43 E. 19th St., New York City. \$4.00.

This book was originally published in 1900, the second thousand being published in 1908. As stated in the preface to this second edition, several new pavements have been developed since the book was first published, and such changes have been made in the methods of constructing the older forms of pavements that a rather complete revision has been necessary. Besides this revision, which has resulted in the increase of the book from 532 to 651 pages, two chapters have been added—one on concrete pavements and the other on the protection of pavements.

As might be expected, perhaps the greatest changes have been made in those parts of the book dealing with asphalts and their uses in pavements. The chapter on asphalt has been increased by 11 pages and the chapter on asphalt pavements has been enlarged from 47 pages to 67 pages. Besides revising this chapter, the author has added several pages on the bitulithic pavement and bituminous concrete pavements, Warrenite and Amiesite being included in the latter. Considerable change has also been made in the chapter on brick pavements, especially with reference to methods of testing the brick. The discussion of wood pavements has also been materially changed, and considerable new matter has been added on the subject of methods of treating. The chapter on concrete pavements in the 1912 edition is entirely new, and occupies 30 pages. It contains

descriptions of the granitoid, the Hassam and the Dolarway pavements, and various recent specifications for cement and cement testing. A new chapter on the protection of pavements occupies 28 pages and deals with the matter of protecting pavements, with especial reference to subsurface work. Many examples are given of conditions existing in New York City, and the rules governing the opening of pavements in force in the Borough of Manhattan, New York City, and Philadelphia, Pa., are also given.

Discussion of Paving at the Meeting of the Utah Society of Engineers

The chief feature of the meeting of the Utah Society of Engineers, held recently at Salt Lake City, Utah, was the reading of papers on street paving by City Engineer D. H. Blossom and his assistant, John Duder.

City Engineer Blossom's paper comprised a collection of local statistics explaining the nature of the various kinds of street paving now in vogue. He showed several samples of modern paving material and had hanging on the wall a sectional drawing in further illustration of his paper. He touched upon the necessity of preserving proper temperature in mixing the asphalt preparations for topping or surfacing, and also explained the difficulty of keeping the material hot on long hauls.

Mr. Blossom devoted a considerable portion of his remarks to natural rock asphalt, citing as demonstrations of its good qualities several instances in which it had been used in Salt Lake City. He stated that the one trouble with natural rock asphalt was that it was not uniform in quality, and said that, in his opinion, if this feature could be eliminated there would be no other material which could approach it in excellence.

Mr. Duder's paper was largely historical, including, among other things, a description of ancient roadways and the development of street paving down through the Middle Ages, particularly in Paris and London, and continuing through experiments in American cities, especially New York City, where Belgian trap rock was first indorsed sixty years ago, supplanting the previously universal cobblestones.

Mr. Duder presented statistics showing the growth and development of street paving methods, and called attention to the fact that the present is the asphalt age. Special reference was made to the quality of the Salt Lake asphalt deposits, products of which are being used successfully in Salt Lake City street paving. Mr. Duder spoke deprecatingly of the fact that Salt Lake City is the only city in the country in which the engineering department prepares street improvement plans and specifications and then hands them over to another department to be carried out.

Good Roads Congress in San Antonio, Texas

A good roads congress held at San Antonio, Tex., October 25, in the interests of good roads in southwestern Texas in particular and throughout the state in general, was attended by delegates from the San Antonio-Corpus Christi Highway League, the San Antonio-Port O'Connor Highway League, the San Antonio-Laredo Highway League, the San Antonio-Denver Highway League, the San Antonio-Blanco and Granite Belt Highway League, the Wilson County Good Roads Association, the Karnes County Good Roads Association, and the Bexar County Highway League.

The program included an automobile parade through the streets in the morning. The cars carried banners with mottoes setting forth the benefits to be derived from good roads. At noon a barbecue was held at the harvest jubilee.

The convention proper was called to order at 2 p. m. by John W. Warren, president of the State Highway As-

sociation, and also of the Bexar County Highway League. Mr. Warren delivered the address of welcome.

G. D. Marshall of Washington, D. C., representing the United States Office of Public Roads, explained the methods employed by other committees to finance the building of highways, and also told of the various materials and methods of construction.

Prof. R. J. Potts, Chief Highway Engineer of the Agricultural and Mechanical College, spoke on the road problems of Texas, and also on the road material available in the state.

Senator H. B. Terrell, of West, Texas, discussed the question of convict labor in connection with building roads, and also spoke of needed legislation for the further improvement of highways in the state.

Quadrennial Report of Maryland State Roads Commission

A report covering the work of the State Roads Commission of Maryland for the years 1908-1911, inclusive, has just been issued by the members of the commission designated as a committee to prepare it. The members of this committee, which was called the Committee on Report and Audit, were S. M. Shoemaker, William Bullock Clark and Charles B. Lloyd. They were appointed by Governor Goldsborough on Jan. 25, 1912, at the first meeting of the commission after his inauguration.

In the resolution introduced by Governor Goldsborough authorizing the appointment of the committee these men were designated and directed to employ an auditing company to audit the accounts of the commission for the past four years and thereby ascertain the cost of the different items in the accomplishment of each piece of work, the cost of machinery, tools and other equipment, and the expense chargeable to engineering and administration. The committee was required to report on the amount of money spent in each county and the city of Baltimore, and to collect data concerning the work yet to be done under the existing legislative acts. The resolution further required a statement of the relative cost of the different methods of construction, that is, by contract, county forces or other special arrangements.

The requirements of the resolution were carried out by the committee, which submitted the report to the General Assembly as directed. The report of the committee is followed by that of Maj. W. W. Crosby, Chief Engineer of the commission during the four years, and by the report of the auditors. The report of the committee comprises 42 pages of text, including 24 pages of tabular matter pertaining to the distribution of expenditures. The work of the commission is taken year by year and the operations of each year are summarized separately, and as a whole; Maj. Crosby's report enters into detail, discusses minutely the work in each county and gives a statement of the cost of each section of road improved. Tables accompanying the report show roads on which state road work and state aid work was done, the names of the inspectors on each piece of such work and the dates of beginning and ending the work on each section. Tables are also given showing in detail contracts let, by years, and contracts completed, by years, in the various counties. Summaries of work done on state and state aid roads are included. Separate tables give data on maintenance and repair work in detail.

Maj. Crosby's report comprises 118 pages, including a number of illustrations, showing examples of work done.

The auditors' report gives statements of the various items of expenditures, including those for construction, construction, maintenance, overhead, road equipment, etc. The reports of the chief engineer and the auditors explain the results of their investigation of the accounts and of a new account system developed and worked out by Maj. Crosby.

CORRESPONDENCE

Compressed Concrete Roads.

Editor "Good Roads":

Statistics show that the maintenance of common macadam roads make them an expensive luxury. The average cost of building the macadam road is about \$3,000 per mile. The average cost of maintaining such a road is about \$600 per mile, according to the engineer's report, in Dallas County.

The interest on \$3,000 at 5 per cent. is \$150, and this, added to the \$600 for maintenance, makes \$750, an amount which will pay the interest on and provide the sinking fund for \$10,000 worth of bonds. The sum of \$10,000 per mile will build a compressed concrete road, and on this class of road the maintenance cost is nominal. The maintenance of the common macadam road estimated at \$600 per mile will require a bond issue every five years to provide for the repairs. This is what Dallas County is up against now. The states of the North provide a highway commission which has full charge of all highways and bridges. The commissioners are experienced and practical men and devote their whole time to their work. To pay the expense of the highway commission, the state assesses a tax of 50 cts. per horse power on each automobile in the state. This creates a large fund which more than pays the expense of the commission and would nearly pay the maintenance and repair charges on compressed concrete roads. It will do so in time, for everybody wants an automobile and will have one as soon as he can pay for it.

Texas needs a highway commission to have full charge of the highways and bridges of the state and of the expending of the bond money in each county. The average commissioner of each county has no practical experience in building roads, and altogether they are wasting thousands of dollars of the bond money each year in building cheap gravel and macadam roads.

Now it is generally conceded that the automobile has come to stay and that it is to be the vehicle of the future. The future roads, then, should be built to stand the automobile traffic. The future road must have a hard surface to stand this traffic so that the suction of the automobile tire will not have the effect of making ruts in the road, as it has on gravel and macadam roads. This required surface is the cement surface and the streets and roads of the future must be of compressed concrete to stand the automobile traffic. The first cost may be more but the practical elimination of the maintenance charges will make them the cheapest in time.

FRANK WHITLEY.

Hillsboro, Tex.

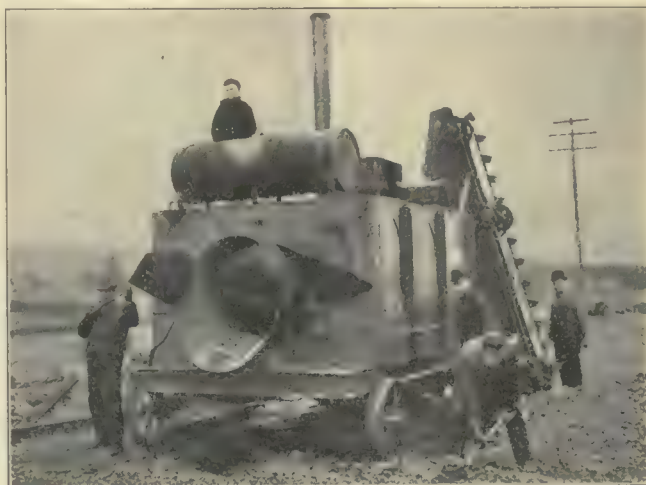
We print the foregoing as an expression of one opinion as to the solution of the problem of how to build roads to carry the traffic, but—as in the case of all communications—without assuming responsibility for any of the statements made or subscribing to any of the opinions expressed. The figure quoted for the cost of macadam construction will seem low to road builders in many localities, though, of course, unit costs vary so greatly in different parts of the country that the bare statement that a particular kind of road cost so much per mile means little. It is also worthy of note that our correspondent falls into the old error of attributing the destructive action of the automobile entirely to the suction of the tire. The comparatively small part played by the suction of the tire in the destructive effect of the automobile has been pointed out many times, both in "Good Roads" and elsewhere, but it continues to be put forth as the cause of something attributable to an entirely different action.

Improved Portable Asphalt Plant

A portable asphalt plant, of a type which has been in use for a number of years but upon which considerable improvement has recently been made, is shown in the accompanying illustration.

The machine consists essentially of three revolving circular chambers, in which materials are dried, heated and mixed, a power plant, oil burners for supplying heat, an asphalt heating tank, measuring hoppers, elevators and other mechanism, all mounted on a steel truck. The ag-

gregate is fed into the machine at the end showing in the illustration and is dried in two drums, one on each side of the large mixing drum showing at the center. These drums, like the mixing drum, are surrounded by air heated to the requisite temperature by means of two burners situated near the bottom of the machine and using fuel oil vaporized by steam from the boiler. From these drums the heated aggregate is automatically transferred to a large measuring hopper, divided into two compartments, placed at the top of the machine at the rear end and discharging into the large mixing drum in the center. The division of the hopper into two sections is for the purpose of making it possible to fill one of them while the other is being discharged. The asphalt is heated in a tank at the top of the machine, from which it is transferred to a measuring tank, which, like the hopper, discharges into the mixing drum. At the rear of the mixing drum is a screw conveyor, on which the aggregate is discharged from the hopper. This conveyor extends a short distance into the end of the drum and drops the aggregate into it. Above this conveyor and extending into the drum a short distance beyond the end of the conveyor is the discharge from the asphalt measuring tank. This allows the asphalt to be delivered



CONTRACTOR'S PORTABLE ASPHALT PLANT, COMPRISING DRYING, HEATING AND MIXING DEVICES.

to the drum slightly beyond the conveyor. The materials pass from this point through the drum and are discharged at the rear, as shown.

One of the chief features of this machine, according to the manufacturers, is that it is impossible to injure either the aggregate or the asphalt by overheating or coking, since fire never comes in direct contact with any of the materials. Other advantages claimed are uniformity of mixture, ability to take aggregate of any kind, ease of regulation and control, and freedom from repair.

The capacity of the machine is given as from 700 to 1,000 sq. yds. of 2-in. surface per 10-hour day. Previous models of the machine have been arranged to move under their own power, but this feature is to be abandoned in the future. It is also stated that the use of the boiler mounted on the machine is to be discontinued, steam being supplied from a portable boiler set up near the plant.

The machine is manufactured by the Guelich Paving Process Co., of Philadelphia, Pa., and is rented or sold to contractors, rental being based upon the number of yards of pavement laid. The machine has been used in various places, one of the most recent being the city of New Brunswick, N. J., where over 20,000 sq. yds. of pavement were laid this summer.

New Contractor's Asphalt Plant in Baltimore, Maryland

A new asphalt plant of large capacity and equipped throughout with modern machinery has recently been built for the F. E. Schneider Paving Co., of Baltimore, Md. In May of the present year practically all of the machinery in the company's old plant was ruined by a fire, and the old plant, having for some time been inadequate, it was decided to build a new one and equip it with thoroughly up-to-date machinery. Work was commenced immediately and completed in the fall, the plant being opened for inspection on October 31, at which time Mayor Preston of Baltimore—who started the machinery—and a number of city officials, engineers and contractors were present.

The main building is 40 by 48 ft. and three stories in height. The frame is of structural steel, covered with corrugated iron, and the floors are of concrete. Two Coatesville rotary driers for heating the mineral aggregate adjoin the building. The other equipment consists of two 15-cu. ft. Iroquois mixers, with steam operated opening and closing devices, placed diagonally opposite each other on the first floor; three asphalt melting kettles, 8 ft. by 9 ft. by 14 ft. deep, containing steam coils and having a capacity of 30 tons each; two hot sand and stone tanks, 9



RECENTLY COMPLETED CONTRACTOR'S ASPHALT PLANT AT BALTIMORE, MD.

ft. in diameter and 10 ft. high, and one other 6 ft. in diameter and 10 ft. high; blowers for exhausting dust and hot air from the mixing floor and for supplying air to the furnaces; dumping devices, screens, loading platforms and other equipment.

Sand and stone are brought to the plant on a railroad track, carried on a trestle about 16 ft. high at the rear of the driers. From here it is dumped to the boot of the cold sand elevators, which convey it to the driers. After passing through these, two conveyors carry the material to the top floor of the building, where it is discharged into large tanks from which it is drawn by gravity to the mixers on the first floor. The asphalt is brought in on the same railroad and lifted by a 2-ton electric elevator to the top floor of the building and into the asphalt melting kettles. After being melted, fluxed and prepared for the paving mixture, it is drawn by gravity through steam heated pipes to the mixers, where it is added to the aggregate. The mixers discharge directly into wagons, in which the material is hauled to the streets. All moving machinery is operated by individual motors, each machine being independent. The boiler plant consists of three 80-HP. boilers, situated in a building a short distance from the main building, the steam being used for heating the asphalt, for the mixer jackets, etc.

With both mixers working, the plant has a capacity of from 4,500 to 5,000 sq. yds. of 2-in. mixture per 8-hour day. It was designed by August E. Christliff, of Baltimore, Md., and built under his supervision, E. W. Burwinkle of the Barber Asphalt Co. acting in an advisory capacity.

Bitulithic Patent Sustained in Grand Rapids Case

A decision, sustaining Patent No. 727,505, the basic patent on bitulithic pavement, has recently been handed down in the District Court of the United States for the Western District of Michigan, Southern Division. The decision was given in the case of Warren Bros. Co., complainant, vs. The City of Grand Rapids and Edward W. Seamans, defendants, a suit brought to enjoin the defendants from a threatened infringement of the patent by the construction of a pavement on Barclay Street, Grand Rapids. The decision was written by District Judge C. W. Sessions, and a decree entered enjoining the defendants from carrying out their contract.

After stating the circumstances out of which the case arose, Judge Sessions quoted that portion of the decision in the well-known Owosso case in which the invention covered by claims 5, 6, 9 and 11 of the patent was described and construed. In this citation, the nature of the invention is stated briefly and the conclusion drawn that the fundamental idea of the patent is not that of stability secured by density but stability secured by the specified grading and arrangement of the mineral constituents in such a way as to minimize the friction of their interaction and result in the carrying of a greater proportion of the wear by the mineral aggregate than by the binder, thus allowing the use of a softer asphalt or bitumen than would otherwise be feasible. In discussing the citation, Judge Sessions calls attention to the claims of the inventor, which, as he interprets them, are that "when mineral particles of properly graded sizes are so combined, mixed and coated with bituminous cement and the whole then thoroughly compacted by pressure, a solid, homogeneous, waterproof wearing surface will be produced in which the voids will be reduced to below 20 per cent., and the mineral particles, because of their intimate contact and interaction, will, in a large measure, be self-sustaining, and therefore less liable to displacement and disintegration than in the usual macadam pavement where the stone and other mineral constituents are arranged in layers of different sizes." Continuing, Judge Sessions says: "He further claims that in such a pavement the traffic load will be carried for the most part by the mineral aggregate itself instead of by the bituminous binder and, therefore, that greater stability and durability will be reached than is possible in sheet asphalt and similar pavements."

The specifications in the contract from which the suit arose called for a wearing surface 2 ins. thick after thorough compression, of which the mineral aggregate should consist of a mixture of broken stone and sand, to which, in some cases, a small quantity of stone dust or Portland cement should be added. The stone was specified to be a crusher run product varying in size from 1/2-in. to the smallest particle retained on the finest mesh screen commonly used in crushing plants, and it was further specified that for a 2-in. wearing surface the stone should vary from that passing a 3/4-in. screen to as small as that held on a 10-mesh screen. It was specified that the dust or fine screenings should be removed as it was usually excessive in amount and irregular in quantity and necessitated the use of more cement. The sand was specified to be similar in character to that commonly used in sheet asphalt paving mixtures, to be hard grained, moderately sharp, free from loam or other foreign material and varying in size from

$\frac{1}{4}$ in. to dust passing a 200-mesh screen. There should not be over 5 per cent. passing a 200-mesh nor more than 30 per cent. held on a 10-mesh screen. The dust specified was either a Portland cement or ground limestone. The proportions of the various ingredients, according to the specifications, were to be three parts stone and two parts sand, to which should be added from 7 to 10 per cent., by weight, of bitumen. If stone dust or Portland cement were added to the mixture, it was specified that a screening of the whole aggregate should not show more than 6 per cent., by weight, passing a 200-mesh screen.

The sole question to be determined, according to Judge Sessions, was whether or not a wearing surface constructed in accordance with these specifications would be an infringement of the complainant's patent. Quoting from a decision rendered by the Circuit Court for the Southern District of New York and affirmed by the Court of Appeals of the Second Circuit in the case of *Warren Bros. Co. vs. the City of New York et al.*, he said: "The claims at issue are for a product, not a process. Of course the claims must be read in the light of the description, but it cannot be doubted that anyone using the Warren pavement will infringe no matter how the pavement is produced. * * *. We are dealing with a pavement, not the method of producing it." Judge Sessions also called attention to the fact that in that case it was decided that a pavement constructed of "crusher run" stone, "passing through a screen with a 1-in. mesh," would constitute an infringement.

As serving to throw light upon the case under discussion, Judge Sessions cited a consent decree entered in the case of *Warren Bros. Co. vs. The City of Grand Rapids, John Kloote and Harry Vanderveen*, in which similar specifications were involved and which was decided in favor of the complainant. Continuing, he concluded that the mineral aggregate produced under the specifications prepared for use on the Barclay Street work would fairly fall within the claims of the patent. The tests made, he said, showed, conclusively, that such an aggregate, thoroughly mixed and properly compacted, would have less than 21 per cent. of voids—the required density of the patented product—and that while such aggregate would not contain the inventor's preferred maximum size of stone it would contain the preferred proportions and the essential grades of sizes and would have a useful degree of stability. "Having the required elements of density and stability," he said, "the product must necessarily possess the 'inherent stability' which is the broad and fundamental idea embodied in the invention and embraced in the patent."

This patent has previously been adjudicated by several United States courts, the first case being that of *Warren Bros. against the City of Owosso*, argued in the United States Court of Appeals for the Sixth Circuit before Judges Lurton, Severens and Cochran. After an exhaustive examination into the patentability of the inventions covered by the patent, a decision was rendered unanimously holding that the patent was valid and a permanent injunction was granted against the defendant. The defendant then appealed to the United States Supreme Court for a writ of certiorari, which was refused.

Other decisions upholding the validity of the patent were rendered in the case of *Warren Bros. Co. against the City of Montgomery, Ala.*, in the Circuit Court of the United States for the District of Alabama; in a suit in the United States Circuit Court for the District of Kansas; in a suit in the United States Circuit Court for the Northern District of Texas, and in a consent decree granted in the United States Circuit Court for the Western District of Michigan.

An injunction restraining the City of New York and the Uvalde Asphalt Paving Co. from infringing this patent was granted by Judge Coxe in the United States Circuit Court

for the Southern District of New York on Dec. 15, 1910. This was appealed by the defendants and the decision of the lower court sustained in the United States Court of Appeals for the Second Circuit by Judges Lacombe, Ward and Noyes. In the opinion, which was written by Judge Lacombe, attention was called to the *Owosso* case and to the statement made by the judge of the court from which the appeal was taken, setting forth the principle that a circuit court should adopt and follow the decisions of the circuit court of appeals in a circuit other than its own when rendered upon facts substantially identical. Continuing, Judge Lacombe said that while the appellants' brief bitterly attacked this statement, the court understood it to be an accurate presentation of the law and made a number of citations to support that finding. The records in the *Owosso* case, he said, were filed as a physical exhibit, the record of the defendant alone consisting of over 1,800 printed pages. "We fully concur," he said, "with Judge Coxe's finding, upon an examination of that record, that the state of the art, as disclosed by prior patents and publication in evidence there is substantially the same as that disclosed here. Practically the only new questions are as to the effect of three alleged prior uses not testified to in the *Owosso* case and as to infringements." The conclusion of the Circuit Court was also bitterly assailed in the defendants' brief, according to Judge Lacombe, the statement being made that "the only defense made to the patent was an assertion of its invalidity by reason of a single instance of prior use in the shape of a sidewalk laid at Long Island City." In commenting upon this, Judge Lacombe called attention to the fact that reference to the *Owosso* record showed a great deal of matter relative to prior patents and prior publications and many pages of discussion of the art generally and of the meaning of the specifications and the claims of the patent in question and other patents taken out by Warren and by others, and that this most cursory examination showed that the 1,800 pages were not wholly devoted to the Long Island City pavement.

The appellants' brief also contained a statement, according to Judge Lacombe, that counsel had high confidence that the court would not even assume that the question of double patenting was considered by the court in the *Owosso* case or any attention paid thereto. After explaining the reference to double patenting by referring to patents Nos. 675,430 and 695,421 issued to Warren Bros., which were in the *Owosso* record, Judge Lacombe said that while the briefs of the *Owosso* appeal were not before the court they were before Judge Jones in the case of *Warren Bros. vs. The City of Montgomery*, and that in that case Judge Jones said: "I find from examination of the defendant's briefs before the Circuit Court of Appeals in that case that the defense of double patenting was brought to the attention of the court and relied on."

"Under these circumstances," Judge Lacombe continued, "the 'assumption' which we are here asked to make is certainly remarkable." He called attention to a previous case in which the court had suggested that it would be charitable for counsel to assume that in disposing of appeals coming before the court it was the court's practice to listen to the arguments and read the briefs. "Certainly it would be most uncharitable," he said, "for this court to assume that some other federal court fails to read the briefs or to consider the arguments therein advanced. All that we are here disposed to assume is that the suggestion in that brief was an inadvertence."

In conclusion, Judge Lacombe said: "As to the three new alleged prior uses and the question of infringement we are in entire accord with Judge Coxe's reasoning and conclusions. The order is affirmed."

Coming Meetings

Dec. 3-6.—American Road Builders' Association.—Ninth Annual Convention and American Good Roads Congress, Music Hall, Cincinnati, O. Secy., E. L. Powers, 150 Nassau St., New York, N. Y.

Dec. 10-14.—National Association of Cement Users.—Ninth Annual Convention, Fort Pitt Hotel, Pittsburgh, Pa. Secy., E. E. Kraus, Harrison Bldg., Philadelphia, Pa.

Personal Notes

H. A. Stevens has resigned as City Engineer of Joliet, Ill., to accept a similar office at Corpus Christi, Tex.

Benjamin E. Briggs, City Engineer of Erie, Pa., has been elected President of the American Society of Municipal Improvements.

Oscar Sanne has resigned his position as structural engineer in the Bridge Department of Chicago, and has engaged in private practice.

Lawrence J. Reed, Vice-President of the R. F. Conway Co., paving contractors, and a director of the International Asphalt Co. and of the Warner-Quinlan Asphalt Co., died in Chicago on Nov. 17.

Arthur H. Blanchard, M. Am. Soc. C. E., Professor of Highway Engineering at Columbia University, at the celebration of Founders' Day at the Clarkson School of Technology, on November 25, delivered an address entitled "The Art and Science of Highway Engineering."

General Notes

Los Angeles has been selected as the place of meeting of the 1913 convention of the Ocean-to-Ocean Highway Association.

Surveys have been made for the system of highways to be constructed in San Mateo County, Cal., under the proposed bond issue of \$1,250,000.

At a recent meeting attended by representatives from the Houston Chamber of Commerce, the Bexar County Highway League and from various towns and counties, the first concrete action was taken toward the establishment of an automobile highway between Houston and San Antonio.

Work has been begun on an improved highway from Carthage to Muraul, Tex., a distance of eight miles, the necessary funds being furnished by popular subscription.

The jail of Independence County, Ark., has been entirely without prisoners for the first time in eight years, all of the convicts being employed on road work.

According to Col. W. P. Richardson, Chairman of the Alaska Road Commission, 30 miles of new road and four bridges have been built this year in that territory.

Drafts of ordinances for street improvements to cost over \$300,000 have been recommended by the Board of Public Improvements of St. Louis, Mo.

Several streets in Little Rock, Ark., are to be paved with creosoted wood blocks at a total expenditure of about \$135,000. Mr. Wetterstrom, of Chicago, holds the contract.

Governor Frear, of Hawaii, has authorized \$100,000 for work on the Hawaii belt road, making a total disbursement of more than half a million dollars for 1912.

Efforts are being made in Minnesota to secure the adoption of the proposed constitutional amendment increasing the levy for highways in the state from $\frac{1}{4}$ to 1 mill.

The Police Jury of Many, Sabine County, La., has decided to have surveys made under State direction of a way leading to Robeline, Natchitoches County, and immediately thereafter to let contracts for the work.

The National Safety Wood Paving Co. has issued an advertising folder calling attention to the non-slippery wood blocks manufactured by that company. The folder is illustrated with line drawings of the grooved blocks, and with a half tone cut showing a Boston street paved with these.

The Missouri Highway Association, at a meeting held in Kansas City on Nov. 20, elected the following officers: President, Roy F. Britton, of St. Louis; Secretary, James B. Gregg, of Joplin; Treasurer, John P. Gordon, of Jefferson City. Executive Committee, Judge H. C. Gilbert, of Kansas City; W. M. Darby, of Cameron, and B. M. Robinson, of Joplin.

An organization of taxpayers in Portland, Ore., is carrying out a campaign for a bond issue of \$2,000,000 for parks, playgrounds, and boulevards.

Letcher County, Ky., will spend \$16,000 on the construction of three bridges on the North Fork—one at Whitesburg, another at Mayking, and the third at Mouth of Rockhouse. The work is scheduled for this winter.

Representative M. Wimberly, of Bibb County, Ga., has announced his intention of introducing into the State Legislature a measure providing a state tax for the building of roads between county seats throughout the state.

A committee has been appointed to go to Albany and present the application for the transferring of the Wayne County highway to the proposed Sodus-Newark improvement, and to ask that the road from Williamson to Sodus be improved as a state highway instead of a county highway.

The Missouri Highway Association has instructed its legislative committee to draft a program of good roads legislation to be submitted to it at a meeting in Jefferson City on December 9. It is probable that the committee will advocate the creation of a State Highway Department for Missouri.

Various counties of Texas are preparing for road improvements in 1913. Victoria County has voted \$200,000 in bonds for this purpose; Calhoun County has voted \$100,000, and the Yoakum precinct in Lavaca County will vote soon on the question of issuing bonds to the extent of \$100,000.

Two rustic bridges, to be built of timber cut from the right of way, will be constructed over Chambers Creek as part of the scenic highway from Tacoma to Stellacoom, Wash., on which work is shortly to be commenced. The bridges will be 525 and 175 feet long, respectively.

Portland, Ore., has projected several large street improvements for 1913, chief among these being the extension of Williams ave., from Cherry St. to a connection with Holladay Ave. by way of Adams St.; a widening of Powell St. from 50 to 60 feet from East 19th to Milwaukee, and extension of that street from Milwaukee to a connection with Woodward Ave. at East 7th St., and ultimately to Grand Ave., and extension of East Burnside St. to the city limits.

CONTRACT NEWS

CONTRACTS PENDING
ROADS AND STREETS.

Date of letting	Reported in issue of
12- 9 Rome, Ga., st. paving.....	11-23
12- 9 Pikeville, Ky., st. paving.....	12- 7
12-18 Fernandina, Fla., vit. brick pav.	11- 9

BRIDGES.

12-10 Demopolis, Ala., two iron bridges	12- 7
12-10 Steubenville, O., substructure..	12- 7
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MISCELLANEOUS.

12- 7 Pearsall, Tex., road bonds.....	10-19
12-17 Cleveland Heights, O., bonds.,	11-32

ROADS AND STREETS.

Bids Asked and Prospective Work.

Albertville, Ala.—A model highway, 6 miles long is to be built between Boaz and Albertville, in Marshall Co.

El Centro, Cal.—It is announced that the City Trustees will be ready to advertise for bids for the paving of several streets as soon as the City Engr. has completed the plans.

Madera, Cal.—A meeting of property owners has been called to consider the matter of paving Yosemite Ave., as far west as R St.

San Francisco, Cal.—The Bd. of Pub. Wks. has under consideration the paving of California Ave. at a cost of \$23,000.

Visalia, Cal.—The City Trustees have ordered the paving of the following streets: East Main, one block east of East St.; Acequia, Court to Locust; Acequia, Bridge to Garden; East St. (Santa Fe), Center to Acequia; Bridge St., Center to Oak; Oak St. (Southern Pacific), from Locust to Garden; Main St., Sncina to Giddings Aves.; Court St., Willow to Tulare Aves.

Denver, Colo.—The Bd. of Pub. Wks. has decided on the route of the proposed stock yards viaduct which will connect the business district with the Brighton Rd. and the stock yards.

Augusta, Ga.—An ordinance has been passed providing for sidewalk improvement as follows: On both sides of Silcox St., between Baille and 15th St.; on both sides of Chafee Ave., between Hicks and Gwinnett Sts.; on both sides of Bohler Ave., from Hicks St. to Walton Way; on both sides of Tuttle St., from Hicks St. to Walton Way; on both sides of Wright Ave., from Hicks St. to Walton Way; on both sides of Liberty St., from Walton Way to Harper St.; on both sides of Bay St., between 3d and 4th Sts.; on both sides of Williams St., between Katherine and Fleming Sts.

Savannah, Ga.—The Bd. of Co. Comrs. has been considering plans to widen Dale Ave. from Waters Rd. to Mechanics Ave., to make it conform with Estill Ave., and to make a boulevard extending from Bull St. to Thunderbolt.

Berwyn, Ill.—Bids will shortly be called for by the Bd. of Local Impts. for a considerable amount of paving work, to be let under seven contracts. Walter V. Aikman is Secretary of the Bd.

Dixon, Ill.—A resolution has been passed by the Bd. of Local Impts. for the construction of brick pavement and concrete curb on 3d St., from the west line of Galena Ave. to the west line of Douglas Ave. The cost is estimated at \$36,551. Charles F. Nesbit is City Engr.

Ottawa, Ill.—The Bd. of Local Impts. has under advisement the matter of improving West Ottawa and Ottawa Aves.

Springfield, Ill.—A bill providing for an appropriation of \$3,000 by the State for paing a road near the Watertown State Hospital will be submitted to the State Legislature at its next session.

Bloomfield, Ind.—The Bd. of Trustees has adopted a resolution ordering the improvement of South St., for a distance of several blocks by the construction of cement sidewalks on both sides of the street.

Indianapolis, Ind.—Resolutions providing for the paving of Broadway, Bolton and Martindale Aves., and 31st, 21st and Wyoming Sts., have been adopted by the Bd. of Pub. Wks.

A preliminary resolution has been adopt-

ed for the permanent improvement of Parkway Ave., between 18th and 30th Sts. The Bd. also directed that Northwestern Ave., from 21st to 32d Sts., be repaired.

Belle Plaine, Ia.—Investigations are being made by the City Council relative to paving materials. It is proposed to pave Main St. and one or two of the principal residence streets next spring.

Pikeville, Ky.—Sealed bids for the construction of about 25,000 sq. yds. of street paving, with vitrified brick on a 6-in. concrete base, including combined concrete curb and gutter, will be received by the City Council until Dec. 9. Address A. S. Reese, City Clk.

Thibodaux, La.—A committee on good roads has been appointed by the Police Jury, and authorized to confer with the State Bd. of Engrs. in regard to the building of an improved road to be selected by the committee, subject to the approval of the Jury. The committee will also solicit the help and financial aid of the state.

Ann Arbor, Mich.—The paving of Hill St., between State and Washtenaw Aves., has been referred to the Bd. of Pub. Wks. with instructions to advertise for bids and set to work next spring.

Battle Creek, Mich.—Several miles of crushed rock streets are to be laid. Address City Clk.

Minneapolis, Minn.—Resolutions have been adopted by the City Council to construct sidewalks on the following streets: Morgan Ave., north, between 26th and 27th Aves. (west side); Dupont Ave., north, between 45th and 46th Aves. (east side); Morgan Ave., north, between 32d and 33d Aves. (both sides); Dupont Ave., north, between 40th and 41st Aves. (west side).

Winona, Minn.—Revised plans and specifications, calling for 8-ft. concrete centers and 6-ft. shoulders of crushed rock, have been adopted for three new highways, to cost not more than \$120,000.

St. Joseph, Mo.—The Bd. of Pub. Wks. has directed the City Engr. to prepare ordinances for paving with brick Market St. and Washington Ave. to 3d St., and for grading 14th St., from Olive to Sacramento Sts.

Newton, N. J.—Plans have been approved by the Bd. of Freeholders of Sussex Co. for the proposed Branchville-Newton improved road, 5.6 miles long; estimated cost, \$60,281.

Brockport, N. Y.—An election has been called by the Village Bd. of Trustees for Dec. 2, to vote upon a special taxation to defray the cost of a brick pavement in Main St., between the canal and State St.

New York, N. Y.—Sealed bids or estimates will be received until Dec. 6, at the office of the Pres. of the Boro. of Brooklyn, for street work as follows: (1) For regulating, curbing and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of E. 23d St., between Newkirk and Foster Aves. (2) For regulating and paving with preliminary asphalt pavement on a 4-in. concrete foundation the roadway of E 31st St., between Snyder and Tilden Aves. (3) For regulating, grading, curbing and laying sidewalks on Ovington Ave., between 14th and 15th Aves. (4) For regulating and paving with permanent asphalt pavement on a 6-in. concrete foundation the roadway of 16th Ave., between 44th and 47th Sts., and between 48th and 54th Sts. (5) For regulating and paving with preliminary asphalt pavement on a 4-inch concrete foundation the roadway of 38th St., from 13th Ave. to West St. (6) For regulating and paving with permanent wood block pavement on a 6-inch concrete foundation the roadway of 48th St., between 12th and 17th Aves.. (7) For regulating, grading, curbing and laying sidewalks on 77th St., between 17th and 18th Aves. Blank forms and further information may be obtained at the office of the Bureau of Highways, the Boro. of Brooklyn, No. 12 Municipal Bldg., Brooklyn. Alfred Steers is Pres. of the Boro.

Preliminary authorizations have been passed for the paving of streets in Brooklyn as follows. With asphalt: Butler Pl., from Sterling Pl. to Plaza St.; Tilden Ave., between Rogers and Nostrand Aves.; E. 7th St., from Church Ave. to Beverley Rd.; 71st St., between 13th and 15th Aves.; E. 32d St., between Snyder and Church Aves.; E. 28th St., from Clarendon Rd. to Canarsie Lane; W. 28th St., between Surf and Mermaid Aves.; Whitwell Pl., between Carroll and 1st Sts.; Billing St., from Evergreen Ave. to the Manhattan Beach

branch of the L. I. R. R.; 38th St., from 13th Ave. to West St.; E. 23d St., between Newkirk and Foster Aves.; 16th Ave., between 44th and 47th Sts., and between 48th and 54th Sts. With wooden block: 48th St., between 12th and 17th Aves. A preliminary authorization was also passed for regulating and grading McKinley Ave., from Railroad Ave. to Elderts' Lane.

Syracuse, N. Y.—Resolutions have been passed by the Bd. of Supvrs. for the improvement of a road leading from Baldwinsville to the Cayuga County line; also for the improvement of the Cedarvale Highway.

Marletta, O.—A petition has been presented to the Co. Comrs. requesting that with state aid, the County continue the paving of Muskingum Rd., from the present paving to a point 1.4 miles further up the river where the March Run Rd. branches off toward Lowell.

Bonham, Tex.—The City Council has ordered the paving of N. Center St.

Orange, Tex.—The Orange Co. Comrs. Ct. has passed an order providing for advertisements for bids for the building of about 75 miles of roads and bridges in Orange County. Bids on gravel and shell with which to surface the roads will also be called for.

Lehi, Utah.—The City Council has decided to construct between 5 and 6 miles of cement sidewalks. Address City Clk.

Seattle, Wash.—A resolution has been adopted, providing that the Bd. of Pub. Wks. shall be instructed to call for alternate bids for brick or bitulithic paving for the west half of Fremont Ave., which is to be paved between Ewing and N. 50th Sts.

Spokane, Wash.—The Bd. of Wks. has decided to repave Ecker St., between Market and Stevenson, and Natoma St., between 8th and 9th Sts., the cost of the latter block being estimated at \$3,900. It has also directed that a new sidewalk be laid at an estimated cost of \$343, in front of St. Mary's square on California St.

Milwaukee, Wis.—The following highways in Milwaukee Co. are slated for improvement: Loomis Rd., from Layton Ave. to Center Rd., 3.25 miles; Center Rd., from Loomis Rd. to Rawson Ave., 0.25 mile; Howell Ave., from Pennsylvania Ave. to a point 2 miles south of the Chicago Rd. and from the flag station to Cudahy, 0.35 mile; the Chicago Rd., from Cudahy to S. Milwaukee, 1 mile, and from there 1.5 mile south; Hawley Rd., from Grand Ave. to Blue Mound Rd., 0.25 mile; Blue Mound Rd., from Hawley Rd. west to the Co. line, 4.25 miles; Port Washington Rd., from Hampton Rd. to a point 2 miles north; Cedarburg Plank Rd., from Milwaukee to N. Milwaukee, 1.25 miles; N. Fond du Lac Rd., for a distance of 2 miles; Kilbourn Rd., from College Ave. south for 2 miles; Mukwonago Rd., for 2½ miles, and Burieligh St., from S. Fond du Lac to Lisbon Rds.

Prince Rupert, B. C.—The City Engr. is reported to have completed plans for the improvement of a road around Kalen Isl. and for about \$150,000.

Bids Received and Contracts Awarded.

Cleveland, Ala.—A contract has been awarded to the C. M. Burkhalter Contracting Co. for grading and macadamizing 7 blocks in Tappan St., at a cost of \$15,223.

Phoenix, Ariz.—The Barber Asphalt Paving Co. was awarded the contract for paving the following sts.: 1st, from Jefferson to Jackson; Jefferson, from 2d to 4th; Washington, from 3d to 5th, and from 4th to 7th; Central, from Jefferson to Jackson, and Adams, from 3d to 5th.

Fresno, Cal.—Bids have been received by the Supervisors for the macadam paving of 20 ft. in the center of Morva University and Van Ness Aves., being the proposed roadway to the State Normal School site. The bids were: California Road and Street Improvement Company, \$9,900; Thompson Brothers, \$9,890; Hall & Hunt, \$8,690.

Inglewood, Cal.—Bids have been received as follows for the improvement of Fir St.: Pearson & Anderson, \$13,408; Frank Gillespie, \$13,552; John D. Marsh, \$14,287; Geo. E. Oswald, \$14,326; Geo. A. Rogers, \$14,832; E. A. Thomas, \$15,671, and M. S. Cummings, \$16,489.

Long Beach, Cal.—The lowest bid received for the improvement of Pine Ave.,

between 6th and 10th Sts., was furnished by Fred Hoffman, at \$8,900.

Los Angeles, Cal.—The Hudson-Johnson Construction Co. has been awarded a contract, at \$18,991.32, for improving the Citrus Ave. section of the county roads.

A contract has been awarded to W. N. Hendricks for street improvements and sewer construction. His bid was \$17,342.78.

Sacramento, Cal.—The State Highway Dept. has received the following bids for the improvement of 6.5 miles of highway north of Sahuenga Pass: Rogers Bros. Co., \$33,048; Hudson Johnson Co., \$33,785; Metropolitan Construction Co., \$34,547; J. M. Montgomery, \$35,513; Engineering & Construction Co., \$36,723; F. Conner Construction Co., \$36,244; Leigg Garnsey, \$42,569, and F. Prendergast, \$50,695.

Santa Monica, Cal.—The J. D. Keen Contracting Co. was the lowest bidder for the construction of asphalt pavements, cement curbs, sidewalks, and sewers in 8th and 9th Sts., the contracts amounting to \$50,000.

Bethel, Conn.—The State Highway Comr. has awarded to Goodman & Trumbull, of Litchfield, a contract for 6,024 lin. ft. of macadam construction on Center St., Greenwood and Diamond Aves., and Grassy Plain St., at \$2.18 per lin. ft. for macadam telford complete.

Haddam, Conn.—Contract has been awarded by the State Highway Comr. to the Curran Corporation, of Middletown, for 2,275 lin. ft. of macadam construction on the Higginum Station Rd., at \$1.69 per lin. ft. for macadam and \$2.15 for telford.

Ridgefield, Conn.—The State Highway Comr. has awarded to F. J. Kellogg, of Danbury, a contract for 5,904 lin. ft. of gravel construction on the S. Salem Rd., at \$2.20 per lin. ft. for gravel and \$2.60 for telford construction.

Windsor Locks, Conn.—A. D. Ambrosia, of Hartford, has received a contract for 3,300 ft. special tar macadam construction on Main St. His price was \$4.92 a lin. ft. for special macadam and \$6.50 for the same with a telford base.

Woodstock, Conn.—A contract for 16,860 lin. ft. of gravel construction on the Woodstock-Southbridge Rd. has been awarded by the State Highway Comr. to the Curran Corporation, of Middletown, at \$1.47

per lin. ft. for gravel and \$2.15 for telford.

West Palm Beach, Fla.—A contract has been awarded to W. E. Watson for the grading and surfacing of that section of the Ocean Blvd. situated between Boynton and Delray. The entire road is 25 miles long and is estimated to cost \$100,000 when completed.

Columbus, Ind.—Contract has been awarded to J. A. Stagg, at \$9,910, for building one mile of the Kocher Rd. on line between Decatur and Bartholomew Cos.

Huntington, Ind.—Contract for the construction of the Young Rd. in Polk Twp. has been awarded to Jackson & Gordon, of Wells Co., Ind., at \$11,999. Other bidders were: Beal & Bell, \$13,562; Modlin, \$13,490; Keefer & Bailey, \$13,365.

Ft. Dodge, Ia.—A contract for paving with 6-in. concrete that section of 3d St. lying between 1st Ave., south, and Bennett Viaduct, has been awarded to Zitterel & Sullivan, of Webster City, at a cost of \$2.25 a sq. yd.

Boston, Mass.—Jas. Doherty has been awarded a contract to pave with tar macadam a section of Mascot St., at \$5,232.

Columbus, O.—The State Highway Comr. has awarded paving contracts as follows: To the Northern Construction Co., for paving with waterbound macadam the West Center Rd. in Bloom Twp., at \$4,310; to Jas. E. Smith, of Salem, O., for paving with brick the Salem-Ellsworth Rd. in Perry Twp., at \$15,825; to Geo. Bauer, of Pomeroy, O., for paving with bituminated concrete, the Rutland-Pomeroy Extension Rd. in Rutland Twp., at \$8,700.

Everett, Wash.—The City Comrs. have awarded the contract for the improvement of 16th St., between Rucker Ave. and Chestnut St., to the Atlas Construction Co., at \$22,852. Other bidders were: W. Henry & Co., \$26,520; American Contracting Co., \$29,081; Atlas Construction Co., \$22,752 for laying a concrete pavement. Asphalt will be used.

BRIDGES.

Bids Asked and Prospective Work.

Demopolis, Ala.—The Co. Comrs. of

Marengo Co. will receive bids until Dec. 10 for the construction of 2 iron bridges over creeks.

Washington, D. C.—The Secretary of War has granted a permit for the construction of the Jefferson Co. bridge across the Arkansas River at Pine Bluff.

Chicago, Ill.—Plans for the construction of a new bridge across the Chicago River at Lake St. have been approved by the Finance Com. of the City Council. Estimates place the cost of the bridge at \$400,000.

Des Moines, Ia.—Plans and models for the proposed bridge over the Raccoon River at 11th St. are being made by the Engineering Dept.

Fulton, N. Y.—The Bd. of Pub. Wks. has declared its intention to have a bridge constructed in N. 1st St., to span the raceway outlet.

Oswego, N. Y.—The Town Bd. is planning to build a \$75,000 bridge over the Oswego River. Address W. W. Rounds, Supervisor.

New Philadelphia, O.—Bids will be received until Dec. 30, by the Bd. of Tuscawawas Co. Comrs., for concrete substructure of a bridge to be built over the Tuscawawas River near the village of Tuscawawas according to plans and estimates on file in the County Auditor's office. W. C. Shott is Co. Auditor.

Steubenville, O.—The Bd. of Comrs. of Jefferson Co. will receive bids until Dec. 10 for the construction of the substructure of Bridge No. 15 in Knox Twp. over Croxton's Run, in accordance with plans and specifications on file in the County Surveyor's office. Address Sherman M. Floyd, Clk. of Bd.

Toledo, O.—According to a report submitted by the Pub. Impts. Com. of Council, the Erie St. Bridge over Swan Creek is to be repaired.

Seranton, Pa.—The Grand Jury has made a report recommending appropriations for 10 bridges constructed of concrete with iron girders. Address County Surveyor.

Houston, Tex.—It has been decided by the City Administration to build a reinforced concrete bridge at the foot of Cap-

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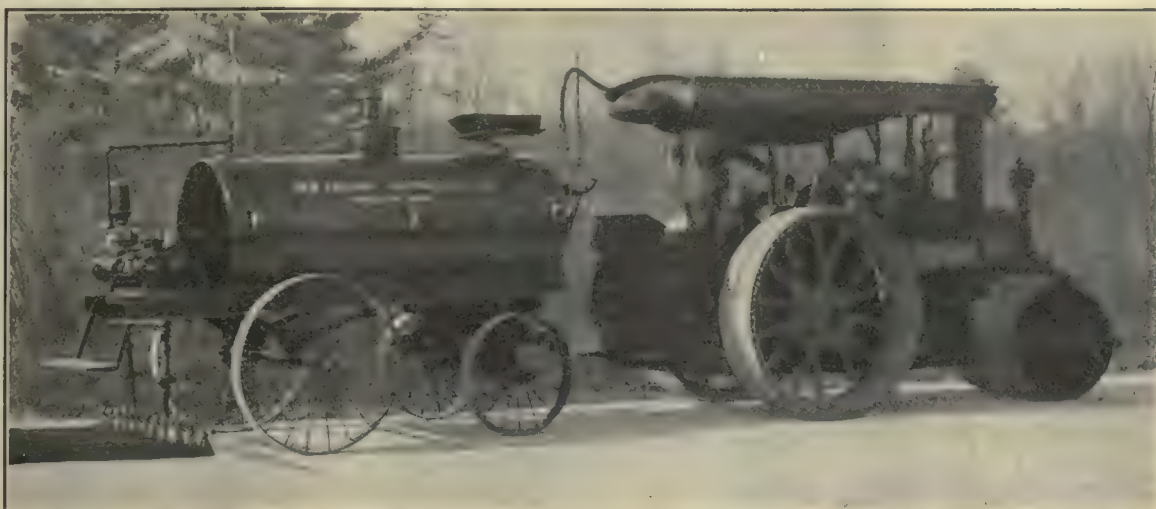
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itol Ave., and City Engr. Dormant has been instructed to draw up plans and specifications for the work. The bridge will be a permanent structure with a roadway 50 ft. wide. The city has agreed also to pave with brick the bridge, as well as the approaches for several blocks from both ends.

It has also been decided to construct a reinforced concrete bridge on the Clinton Rd., near the Merchants and Planters' Oil mills, just within the city limits, replacing the present wooden structure.

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Old Series, Vol. XLII.
New Series, Vol. IV.

NEW YORK, DECEMBER 14, 1912

Number
24

Ninth Annual Convention of the American Road Builders' Association and the American Good Roads Congress

The Ninth Annual Convention of the American Road Builders' Association, the American Good Roads Congress and the Fourth Annual Exhibition of Road Making Machinery, Materials and Appliances were held at Music Hall, Cincinnati, on Tuesday, Wednesday, Thursday and Friday of last week. The meeting was attended by about 1,300 delegates, and the exhibition comprised displays consisting of 86 exhibits, including commercial, state, municipal and educational exhibits.

First Session.

The first session, on the forenoon of Tuesday, December 3, which was called to order at 11 a. m. by President Nelson P. Lewis, was taken up by addresses of welcome and responses. The first address of welcome was delivered by Mayor Henry T. Hunt, of Cincinnati, on behalf of the city. Mr. Hunt was followed by Congressman-elect Stanley E. Bowdle, representing Governor Harmon, who extended the welcome of the state; Thomas L. Pogue, County Prosecutor of Hamilton County, who welcomed the delegates on behalf of the county, and Walter A. Draper, Chairman of the Cincinnati Chamber of Commerce, on behalf of that organization.

The addresses of welcome were followed by responses on behalf of the American Road Builders' Association by President Lewis; on behalf of the visiting state officials by Frank F. Rogers, Deputy State Highway Commissioner of Michigan, and on behalf of visiting city officials by Mayor Francis T. Reeves of Waterbury, Conn.

The last business of the session was the appointment of the committee on credentials and the committee on resolutions. The committees were appointed by the Chair and were as follows:

Credentials: R. A. Meeker, State Highway Engineer of New Jersey; Robert C. Terrell, Commissioner of Public Roads of Kentucky; Frank F. Rogers, Deputy State Highway Commissioner of Michigan; Samuel Hill, Honorary Life President of the Washington State Good Roads Association; E. L. Powers, Editor of "Good Roads," and Roy W. Schenck, Secretary of the Laramie County Good Roads Association, Wyoming.

Resolutions: Harold Parker, Vice President of the Hasmam Paving Co. and formerly Chairman of the Massachusetts State Highway Commission; A. N. Johnson, State Highway Engineer of Illinois, and Arthur H. Blanchard, Professor of Highway Engineering at Columbia University, New York City.

After the announcement of the appointment of committees, President Lewis called upon Samuel Hill, of Washington, and after a few remarks by Mr. Hill the convention adjourned until afternoon.

Second Session.

The second session was called to order promptly at half past two on Tuesday afternoon, the first speech being the opening address by President Lewis.

This was followed by the presentation of three papers on different phases of the general subject, "The Organization of a Highway Department." The organization for a state was presented by Maj. W. W. Crosby, Chief Engineer of the Maryland Geological Survey; that for a large city by Wm. H. Connell, Chief of the Bureau of Highways and Street Cleaning of Philadelphia, Pa., and that for a county and a township by A. N. Johnson, State Highway Engineer of Illinois. The discussion on this subject was opened by James H. MacDonald, State Highway Commissioner of Connecticut, who was followed by J. de Pulligny, Engineer-in-Chief of the Board of Public Works of France and Director of the French Mission of Engineers of the United States; Col. E. A. Stevens, State Highway Commissioner of New Jersey; P. W. Spaulding, of Evanston, Wyo.; A. J. McPherson, Chairman of the Highway Commission of the Province of Saskatchewan, Canada; C. Gordon Reel, State Superintendent of Highways of New York, and A. R. Hirst, State Highway Engineer of Wisconsin.

Third Session.

The third session of the convention was called to order shortly after 10 o'clock on Wednesday morning by President Lewis, who introduced Vice President Harold Parker as chairman of the session.

The first paper was "Bituminous Pavements for City Streets," presented by Geo. W. Tillson, Consulting Engineer to the Borough President, Borough of Brooklyn, New York City. The discussion on Mr. Tillson's paper was opened by Clifford Richardson, Consulting Engineer, of New York City, and continued by R. Keith Compton, Chairman of the Paving Commission of Baltimore, Md.; L. K. Rourke, Commissioner of Public Works of Boston, Mass., and others.

This discussion was followed by a paper entitled "Cresoted Wood Block Pavement in the City of Minneapolis, Minn., as Laid by the City by Day Labor" by Ellis R. Dutton, Assistant City Engineer of Minneapolis, Minn. As Mr. Dutton was unable to be present, the paper was read by Chairman Parker. H. W. Klausmann, City Engineer of Indianapolis, Ind., who was scheduled to open the discussion on Mr. Dutton's paper, was not present, and the discussion was thrown open to the convention. J. C. Travilla, Street Commissioner of St. Louis, spoke at some length on the subject, with especial reference to the methods of laying wood block pavement in the city of St. Louis and answered a number of questions put by delegates.

The next paper scheduled was "Cuts in Newly Paved Streets." This paper was to have been presented by H. M. Waite, City Engineer of Cincinnati, Ohio, but he was detained by business and his place was taken by J. E. Barlow, Assistant City Engineer of Cincinnati, who presented a paper on the same subject. The paper was discussed by M. de Pulligny.

The paper on "The Development of a Plan for a State Road System" by James R. Marker, State Highway Commissioner of Ohio, which had been postponed from Tuesday afternoon because of Commissioner Marker's inability to be present, was presented next. After its discussion by Col. E. A. Stevens, State Highway Commissioner of New Jersey, the convention adjourned until afternoon.

Fourth Session.

The first paper of the afternoon session on Wednesday was entitled "The Contractor's Point of View," and was presented by Hugh Murphy, a public works contractor of Omaha, Neb. The presentation was followed by a long and animated discussion by engineers and contractors, opened by John R. Rablin, Chief Engineer, Metropolitan Park Commission, Boston, Mass. Among those taking part in the discussion were F. E. Ellis, Manager, Essex Trap Rock & Construction Co., Peabody, Mass.; Maj. W. W. Crosby, Chief Engineer, Maryland Geological Survey; A. J. Rockwood, a road contractor of Rochester, N. Y.; L. K. Rourke, Commissioner of Public Works, Boston, Mass.; Henry G. Shirley, Chief Engineer, Maryland State Roads Commission; Frank Agnew, Road Commissioner of District No. 1, Mahoning County, Ohio; Ralph H. Pyne, a road contractor of Newport, Ky.; C. A. Kenyon, President, Indiana Good Roads Association; H. G. Zeller, a contractor of Swanton, Ohio; Frank F. Rogers, Deputy State Highway Commissioner of Michigan, and Nelson P. Lewis, Chief Engineer, Board of Estimate and Apportionment, New York City.

The last paper of the day, "Plant Equipment," was presented by F. E. Ellis, Manager of the Essex Trap Rock & Construction Co., of Peabody, Mass.

Fifth Session.

The fifth session of the convention opened on Thursday forenoon with the presentation of a paper entitled "Some Features of Macadam Construction" by T. R. Agg, Road Engineer of the Illinois State Highway Commission. The discussion on the paper was opened by R. A. Meeker, State Highway Engineer of New Jersey, and was participated in by Frank F. Rogers, Deputy State Highway Commissioner of Michigan; John S. Gillespie, Road Commissioner of the Allegheny County Road Department, Pittsburgh, Pa., and W. P. Blair, Secretary of the National Paving Brick Manufacturers' Association.

The next paper, "Earth and Gravel Roads," presented by Robert C. Terrell, Commissioner of Public Roads of Kentucky, was discussed by Richard H. Dixon, Jr., County Road Engineer of Dorchester County, Maryland; Geo. W. Cooley, State Engineer of Minnesota, and J. Charles Dayton, County Superintendent of Highways of Cayuga County, New York.

The last paper of the session, "Highway Bridges and Culverts," was presented by W. A. McLean, Provincial Engineer of Highways of Ontario, Canada, and was discussed by A. W. Dean, Chief Engineer of the Massachusetts State Highway Commission, and L. R. Grabill, Superintendent of County Roads of the District of Columbia.

Before the noon recess, President Lewis announced the result of the canvass made by ballot at Wednesday's session for the selection of the subjects for topical discussion on Friday morning and that the business meeting of the American Road Builders' Association scheduled for Friday afternoon would be held at the close of the afternoon session on Thursday. The session was then adjourned until afternoon.

Sixth Session.

The sixth session of the convention was opened on Thursday afternoon, the first paper being "The Economics of Highway Construction" by Clifford Richardson, Consulting Engineer, New York City. The discussion of this paper was opened by C. Gordon Reel, State Superinten-

dent of Highways of New York. W. P. Blair and Major W. W. Crosby also took part in the discussion.

"The Traffic Census as a Preliminary to Road Improvement" by Col. Wm. D. Sohler, Chairman of the Massachusetts Highway Commission, was presented next, and was discussed by Professor Arthur H. Blanchard of Columbia University, New York City, and A. R. Hirst, State Highway Engineer of Wisconsin.

The last paper of the afternoon was "The Laying of One Hundred and Four Miles of Smooth Road Surface in One Borough in Five Months," by G. Howland Leavitt, Superintendent of Highways of the Borough of Queens, New York City.

At this point, Raymond Beck, Manager of the Touring Bureau of the B. F. Goodrich Co. of Akron, Ohio, presented a paper on "The Development of Road Systems from the Automobillist's Point of View," which, according to the ruling of the Chair, will be printed as a part of the discussion on Commissioner Marker's paper, "The Development of a Plan for a State Road System."

Seventh Session.

The seventh session, on Friday morning, was devoted to discussion on the topics selected by ballot and announced on Thursday. Each subject was allowed approximately three-quarters of an hour, the speaker introducing it being allowed from ten to fifteen minutes and speakers following five minutes each.

The first topic discussed, that indicated as the first choice of the convention by the vote, was Topic 2—"Convict labor on road work." The discussion was opened by Samuel Hill, Honorary Life President of the Washington State Good Roads Association, and was participated in by Geo. W. Cooley, State Highway Engineer of Minnesota; O. J. Stilwell, Secretary of the International Good Roads Association, Ogden, Utah; H. C. Penfield, of the American Clay Machinery Co., Bucyrus, Ohio; P. W. Spaulding, of Evanston, Wyo.; W. E. Atkinson, State Highway Engineer of Louisiana; Nelson P. Lewis, Chief Engineer of the Board of Estimate and Apportionment of New York City; A. H. Hinkle, Deputy in Charge of Maintenance, State Highway Department of Ohio, and John M. Goodell, of Upper Montclair, N. J.

The discussion on the next subject, Topic 5—"Division of expense of road improvement over town or similar local unit, county, state and nation," was introduced by Roy W. Schenck, Secretary of the Laramie County Good Roads Association, Wyoming, and was participated in by R. A. Meeker, P. W. Spaulding, Frank F. Rogers, H. C. Penfield, O. J. Stilwell, Nelson P. Lewis, J. Chas. Dayton, County Superintendent of Highways of Cayuga County, New York; W. A. McLean, J. M. Goodell, of Upper Montclair, N. J.; M. W. Torkelson, Bridge Engineer of the Wisconsin State Highway Commission, and others.

The third subject of discussion, Topic 3—"Correction of alignment and grade in existing highways," was introduced by J. Y. McClintock, County Superintendent of Highways of Monroe County, New York. Others taking part in the discussion were H. W. Durham, Chief Engineer of Highways of the Borough of Manhattan, New York City; L. R. Grabill, Superintendent of County Roads of the District of Columbia; R. A. Meeker, Samuel Hill, and M. W. Torkelson.

The fourth subject of discussion, Topic 7—"Dust prevention," was opened by James H. MacDonald, State Highway Commissioner of Connecticut, who was followed by R. H. Gillespie, Chief Engineer of Sewers and Highways of New York City; Henry G. Shirley, L. R. Grabill, and Walter A. Evans, Director of the Board of Freeholders of Essex County, New Jersey.

At the close of this discussion, the convention was adjourned sine die.

GOOD ROADS

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THE A. R. B. A. CONVENTION.

The ninth annual convention of the American Road Builders' Association, including the American Good Roads Congress, and the road exhibition held in connection with it at Cincinnati, Ohio, on Tuesday, Wednesday, Thursday and Friday of last week, was undoubtedly the most successful, from every point of view, of any similar meeting ever held in the United States.

For several months the officers of the association having the arrangements in charge had been planning for the meeting and everything possible had been done to insure the success of the convention. The thorough and carefully arranged program prepared for the technical sessions was carried out practically as arranged, the discussions on the various subjects considered were as valuable and instructive as had been expected, and the exhibits exceeded in number and variety the expectations of the association officials. Though the attendance was slightly less than that predicted by some of the highest estimates made before the meeting, the registration was greater than that at any previous road convention, except, perhaps, the 1911 convention at Rochester, and the character of the attendance offset many times any lack in numbers. No convention of its kind ever held in this country was ever attended by so many state and county officials, city officials from the street departments, road engineers, and contractors handling road and street work.

The subjects considered in the technical sessions of the convention were presented in a series of fourteen technical papers by men especially selected because of their familiarity with the subjects discussed, and were followed by discussions opened by especially selected experts and then thrown open to the convention. In addition to these papers, there was an opening address by the President and a descriptive paper presented at one of the sessions, both of which were of a technical character. One session, the last, was devoted to the discussion of four topics selected from a list of eight by vote of the convention, and proved to be an especially important part of the proceedings.

Taking into consideration the several circumstances tending to handicap the American Road Builders' Association in the holding of this convention, the officials of the association are to be congratulated on having succeeded not only in making the meeting successful, but, in addition, making it a meeting that for real, practical value surpassed all previous meetings of the association and so, of course, all road conventions yet held in this country.

Fourth Annual Road Exhibition

In connection with the Ninth Annual Convention of the American Road Builders' Association and the American Good Roads Congress at Cincinnati, there was held the Fourth Annual Exhibition of Road Making Machinery, Materials and Appliances, to which was added this year exhibits by states, municipalities and educational institutions. There were 66 commercial exhibits and 20 others, including that by the U. S. Office of Public Roads, various states, cities and educational institutions, making a total of 86—the largest number ever made at a road convention in this country.

The commercial exhibits, which were displayed on the main floor of Exhibition Hall, comprised road machines and materials of all kinds, the equipment displayed ranging from powerful road rollers and traction engines to small hand-pouring pots and including practically all of the equipment commonly used by the road contractor. The materials shown included stone, gravel, sand, oils, asphalts and tars; wood and brick paving blocks, and various materials used in paving and road making. The exhibits also included engineers' instruments, concrete products, culvert pipe and the like.

The exhibitors having space on the main floor were as follows:

Acme Road Machinery Co.	Headley Good Roads Co.
Adams Co., J. D., and Ohio	Hetherington & Berner.
Tractor Mfg. Co.	Huber Manufacturing Co.
American Asphaltum & Rubber Co.	Huron Trap Rock Co.
American Association of Creosoted Wood Paving Mfrs.	Ingersoll-Rand Co.
American Culvert Mfg. Co.	Kent Machine Co.
American Rolling Mill Co.	Lansing Co.
Amies Road Co.	National Paving Brick Manufacturers' Association.
Bain Wagon Co.	National Surety Co.
Barrett Manufacturing Co.	Novo Gas Engine Co.
Bausch & Lomb Optical Co.	Ohio Road Machinery Co.
"Better Roads,"	Pioneer Tractor Mfg. Co.
Blome Co., R. S.	Portage Silica Co.
Blystone Machinery Co.	Republic Creosoting Co.
Bucyrus Co.	Kobeson Process Co.
Buffalo Pitts Co.	Shannon, W. T.
Burch Plow Works.	Steel Protected Concrete Co.
Carey Co., Philip.	Stevenson & Leonard.
Carlyle Paving Brick Co.	Tarrant Mfg. Co.
Case Threshing Machine Co., J. I.	Texas Company.
Concrete Guard Rail Co.	Thew Automatic Shovel Co.
Cressy, Walter.	Troy Wagon Works.
Dietzgen Co., Eugene.	United Gas Improvement Co.
Dolarway Paving Co.	United States Asphalt Refining Co.
Doran & Co.	Universal Portland Cement Co.
Dunn Wire-Cut-Lug Brick Co.	Universal Road Machinery Co.
Eagle Wagon Works Co.	Warner-Quinlan Asphalt Co.
Eureka Machine Co.	Warren Brothers Co.
Farquhar, A. B., Co.	Watson Wagon Co.
Gallon Iron Works.	Westrumite Co.
"Good Roads."	Wheeling Mold & Foundry Co.
Good Roads Machinery Co.	Yellow Pine Manufacturers' Association.
Guelich Paving Process Co.	
Harry Brothers Co.	
Hassam Paving Co.	

On the second floor of the Exhibition Hall were the exhibits of twelve states, the District of Columbia, the United States Office of Public Roads, Rensselaer Polytechnic Institute, the Massachusetts Institute of Technology, the University of Ohio, the University of Cincinnati and the cities of Cincinnati and New York, the latter including exhibits from each of the five boroughs of Manhattan, The Bronx, Richmond, Brooklyn and Queens. The eleven states having exhibits were Connecticut, Illinois, Kentucky, Massachusetts, Michigan, New Jersey, New York, Ohio, South Carolina, Washington and Wisconsin.

Business Meeting of the American Road Builders' Association

The business meeting of the American Road Builders' Association was held immediately after the close of the technical proceedings on Thursday afternoon. The first matters coming before the meeting were invitations from different cities desiring to secure the next convention of the association. The first, from Washington, D. C., was presented by L. R. Grabill, Superintendent of County Roads of the District of Columbia, who extended the formal invitation of the city and then spoke briefly urging its advantages as a meeting place. The President then read telegrams from the Chicago Association of Commerce and Mayor Carter H. Harrison of that city, inviting the association to hold its next convention there, and another telegram of invitation from Dallas, Texas.

The report of the Committee on Resolutions, embodying two resolutions, was then presented by Harold Parker, Chairman of the committee, and accepted. The resolutions were as follows:

In acknowledgment of the assistance so freely given by the Governor of the State of Ohio, representing the people as a whole; the county officials, representing the counties; the Mayor and city officials of Cincinnati, representing the business men of Cincinnati; the State Department of Highways, representing the art and science in which the members of this Association are most seriously interested; the United States Office of Public Roads, representing the Federal Government; the State University of Ohio; the University of Cincinnati, O.; the states, cities and educational institutions which have contributed to the success of this congress; and all exhibitors who have by their efforts made the exhibition the largest and most complete of any congress held in this or any other country; it is resolved that:

The American Road Builders Association appreciates the assistance and co-operation of each and every one, and that to each and all the sincere thanks of the Association are extended.

The American Road Builders' Association, in the ninth annual convention assembled, hereby declares its unqualified support of the appointment of a committee by the President of the United States, consisting of experts in the construction and maintenance of highways and the relative material requirements of different sections of the United States, to investigate and report upon the advisability of establishing a system of national highways.

After the adoption of this report, Harold Parker moved the appointment of a nominating committee consisting of John R. Rablin, Chief Engineer of the Metropolitan Park Commission of Boston, Mass.; Jos. W. Hunter, Deputy State

Highway Commissioner of Pennsylvania; Henry G. Shirley, Chief Engineer of the Maryland State Roads Commission; Robert C. Terrell, Commissioner of Public Roads of Kentucky, and Geo. W. Cooley, State Engineer of Minnesota. The motion was seconded and carried, after which the meeting adjourned.

Illustrated Lectures at the Convention

On the evening of Thursday, December 5, a series of illustrated lectures on various types of pavements was given in the auditorium of Music Hall.

The construction of brick pavements and the advantages of this type of construction were explained by Will P. Blair, Secretary of the National Paving Brick Manufacturers' Association, and illustrated by views of brick roads during and after construction. A similar talk on wood block paving was given by Geo. W. Warmoth, of the American Association of Creosoted Wood Paving Manufacturers, and, like the other, was illustrated with views showing wood block pavements in various parts of the country. Concrete road construction in Wayne County, Michigan, was described by J. H. Chubb, of the Universal Portland Cement Co., and illustrated by moving pictures showing the roads before improvement, the work in progress, and completed roads.

Smoker Given Convention Delegates by the Business Men's Club of Cincinnati

The delegates and guests at the convention were entertained at a smoker given by the citizens of Cincinnati on the evening of Wednesday, December 4. The smoker was held at the Business Men's Club and was attended by a large number of the delegates.

During the early part of the evening refreshments were served and a musical entertainment was provided, the program being in charge of the Local Entertainment and Reception Committee, of which John L. Shuff was Chairman. Later, informal talks were given by various convention delegates and local men, lantern slides being used, in some cases for illustration.

Coming Meetings

Jan. 21-23.—American Wood Preservers' Association.—Annual Convention, Chicago, Ill. Secy., F. J. Angler, B. & O. R. R., Baltimore, Md.

Personal Notes

H. E. Anschutz has been appointed City Engineer of Clearwater, Fla.

Walter S. Ruff has been appointed Director of Public Service at Canton, O.

Edgar M. Noel, head of the Noel Construction Co., of Baltimore, Md., died on Nov. 29 at his home in that city.

James Mutter, Racine, Wis., has been elected County Highway Commissioner of Racine County.

George N. Randle has resigned as Superintendent of Streets of Sacramento, Cal., to take charge of the Sutter Basin irrigation project.

William F. Robertson, C. E., of Charlotte, N. C., has been elected City Manager of Sumter, S. C., under the new plan of administration adopted by that city.

General Notes

A preliminary survey has been started at Huron, N. Y., in connection with the proposed state highway from Oswego to Rochester.

The Board of Supervisors of Steuben County, N. Y., has fixed taxes for the upkeep of highways at \$105,882, and for bridges at \$23,650.

The National Highways Protective Society has announced that it will renew its crusade against posting advertisements on the public highways.

State Highway Commissioner James R. Marker, of Ohio, will recommend to the next legislature that an appropriation of \$1,760,000 be made for good roads in his state. This will be an average apportionment of about \$20,000 for each county.

Members of the Northwest Improvement Association in Kansas City, Mo., are working for the erection of a bridge across the Missouri River near the Quindaro boat landing.

The amount appropriated for highway work for the coming year in Genesee Co., N. Y., is \$66,035. In addition to this \$22,175 will be received from the state, making a total of \$88,210.

The Clarksburg, W. Va., Board of Trade has adopted recommendations for a bond issue of \$392,000 for road improvements in the Clark and Coal Districts of Harrison County.

Arrangements are now being made for the third annual convention of the Colorado Good Roads Association, to be held in Denver in the early part of January. It is announced that Governor-elect Ammons will be one of the principal speakers.

The Iowa Good Roads Association will hold a conference in Des Moines, Dec. 17 and 18, to hear reports regarding the road work done during the year now ending and to discuss suggestions for new legislation to be asked for at the incoming General Assembly.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

Date of letting	Reported in issue of
12-17 Cincinnati, O., macadamizing, etc.	12-14
12-18 Ferdinand, Fla., vit. brick pav.	11-9
12-19 Little Rock, Ark., street walk.	12-14
12-19 Natchez, Miss., co. roads.	12-14
12-19 Johnson City, Tenn., street work.	12-14
12-19 Dallas, Tex., brick or wood paving.	12-14
12-23 Columbus, O., grading & paving.	12-14
12-24 New York, N. Y., paving.	12-14
12-28 Cleveland, O., road work.	12-14
1-4 Cleveland, O., road work.	12-14

BRIDGES.

12-17 Taunton, Mass., bridge.	12-14
12-17 McMinnville, Ore., superstructure.	12-14
12-18 Chicago, Ill., sub and superstructure.	12-14
12-19 Courtland, Va., 11 steel & con. bridges.	12-14
12-20 Toronto, Ont., 4 steel bridges.	12-14
12-21 Richmond, Va., 2 concrete bridges.	12-14
12-28 Sheridan, Ark., bridge.	12-14
1-2 Tallulah, La., 2 steel bridges.	12-14
1-8 Council Grove, Kan., bridge.	12-14
1-8 Thief River Falls, Minn., steel bridge.	12-14
2-1 Yosemite, Cal., 4 bridges.	12-14

MISCELLANEOUS.

12-17 Cleveland Heights, O., bonds.	11-23
12-18 Toledo, O., bridge bonds.	12-14
12-19 New York, N. Y., bridge plaza.	12-14
12-24 Rawson, O., paving bonds.	12-14
12-26 Cleveland, O., bonds.	12-14
12-30 Strongsville, O., bonds.	12-14
1-2 Annapolis, Md., bonds.	12-14

ROADS AND STREETS.

Bids Asked and Prospective Work.

Selma, Ala.—The Council has decided to pave 2 streets with asphalt. Address City Clk.

Phoenix, Ariz.—State Engr. Lamar Cobb has completed plans for the state highway between Graham and Cochise, and contracts will be let in a few weeks by the State Bd. of Control.

Little Rock, Ark.—Sealed proposals will be received until Dec. 19, by the Bd. of Comrs. for St. Impt. Dist. No. 211, for the grading, draining, curbing and paving of approximately 14,400 sq. yds. of wood blocks, asphalt, brick, bitulithic or other material as the Bd. may select. Ford & MacCrea, Gazette Bldg., are Engrs. for the dist.

Covina, Cal.—Specifications are now being completed for the construction of an asphalt and oil macadam pavement on Puente St. for a distance of 1 mile.

Los Angeles, Cal.—The City Council has passed an ordinance providing for the improvement of Compton Ave., between 20th and 38th Sts.

San Bernardino, Cal.—The Bd. of Supvrs. is considering the construction of a highway from Skyland to a point on the Victorville Rd. Co. Surv. Bright is preparing estimates.

San Mateo, Cal.—Surveys are being made for the new system of highways to be built under the proposed bond issue of \$1,2450,000.

Santa Barbara, Cal.—The City Engr. has completed plans and specifications for the first section of street improvements to connect with the state highways. The construction will be 6-in. concrete base with 1½-in. asphalt wearing surface, and the cost is estimated at \$150,000.

Denver, Colo.—The Bd. of Pub. Wks. has decided to pave with asphalt several streets in the 6th Dist. Address Seth B. Bradley, Pres. of the Bd.

Brooksville, Fla.—The city will spend \$20,000 to pave many streets with vitrified brick. Address C. M. Price, Mayor.

Miami, Fla.—It is announced that \$50,000 will be expended on paving streets. Address J. E. Lummus.

Bloomington, Ill.—The Bd. of Local Impts. has taken steps for the extension to the city limits of the S. Main St. pavement.

Monmouth, Ill.—The Council is planning to pave S. Main St. Address City Engr. Ferguson.

Ottawa, Ill.—It is planned to pave several streets. Address City Clk.

Cannelton, Ind.—It is reported that an election will be held to vote on the expenditure of \$50,000 for a system of rock roads which will gradually be extended throughout Perry Co.

Belle Plaine, Ia.—Plans and specifications are being prepared for paving about 40 blocks of streets. Address City Clk.

Clinton, Ia.—The City Council has passed a resolution for the repaving of 5th Ave., from 5th St. to Bluff Blvd., the material to be concrete, brick, asphalt or "Dolarway." It is announced that bids will be opened early in 1913.

Corning, Ia.—The City Council is planning to pave several streets next spring. Address City Clk.

Council Bluffs, Ia.—A resolution has been passed by the City Council declaring it necessary to construct combined curb and gutter on both sides of Vine St. between Bryant and Main Sts., and on both sides of 1st Ave., between Main and 4th Sts., Chas. J. Duff is City Clk.

Des Moines, Ia.—The City Engrs. have begun a survey of the south bank of the Raccoon River for the opening of 7th St., and for the building of a bridge over the river.

Hampton, Ia.—Plans have been prepared for paving 40 blocks of city streets. Address City Clk.

Manchester, Ia.—The City Council is planning to pave Main St. Address City Clk.

Dodge City, Kan.—The City Comn. will curb and construct cement walk on certain portions of 5th St. Address City Engr.

Dayton, Ky.—Plans that have been accepted for the improvement of 6th Ave. provide for a street 36 ft. wide between O'Fallon Ave. and Vine St., 32 ft. between Vine St. and Berry Ave., and 36 ft. from Berry Ave. to Main St.

Many, La.—On the completion of a 10-mile road from Many to the parish line, it is intended to consider the construction of about 50 miles of roads throughout Sabine Parish.

New Iberia, La.—Surveys are being made for about 15 miles of clay and sand roads in Iberia Parish.

Charlotte, Mich.—Six thousand dollars is available for paving 2 new streets. Address City Clk.

Detroit, Mich.—The Council has decided to pave several streets and alleys. Address Max C. Koch, City Treas.

Grosse Ile, Mich.—The residents plan a \$200,000 drive. Address Engr.

Lapeer, Mich.—The City Council is planning to pave part of Saginaw St. Address City Engr.

Minneapolis, Minn.—Plans are ready for a rural highway from Central Ave., Minneapolis, to Bethel, a distance of about 20 miles. The estimates call for a gravel road to cost about \$3,500 a mile.

Natchez, Miss.—It is announced that bids will be received until Dec. 19 for building county roads.

Batavia, N. Y.—The Bd. of Supvrs. has voted to build 17 miles of highway between Byron and Rochester; also to continue the state road in Darien to the Alexander line.

Brookport, N. Y.—The taxpayers have voted to raise \$7,900 for a brick pavement in Main St., from the canal bridge to State St.

New York, N. Y.—Sealed bids or estimates will be received by the Pres. of the Boro. of Richmond until Dec. 24 for regulating and repaving the following streets: (1) Broad St., between Gordon and Van Duzer Sts. (napped granite block on concrete foundation); (2) Granite Ave., from Richmond Terrace to Cedar St. (bituminous concrete on present macadam foundation); (3) Broadway, from Union St. to Henderson Ave. (wood block). The plans and contract, including specifications, may be seen at the office of the Engr. of the Boro. of Richmond, Boro. Hall, St. George, S. I.

Minot, N. D.—The City Comrs. are planning to pave several streets at a cost of \$30,000. Address E. J. Thomas, City Engr.

Akron, O.—Ordinances have been passed for the improvement of Poplar St., between Commins and Holloway Sts., and of Kenyon St., between Princeton and South Sts., by grading, curbing, paving and constructing sidewalks. A resolution was also passed to grade, curb, and pave

Eagle St., between Grant and Washington St. Address Ira A. Priest, Clk. of Council.

Canton, O.—Ordinances have been passed to grade, curb, drain and pave with vitrified block Allen St., between Charles and Kimball Sts., and a section of Marvin Ave.; also to proceed with the improvement of S. McKinley Ave., from Cedar St. to South End. Address B. F. Faust, Clk. of Council.

Cincinnati, O.—Sealed proposals will be received at the office of the Director of Pub. Service, City Hall, until Dec. 17, for the improvement of Terrace Ave., between Ormond and Clifton Aves., by grading, macadamizing the roadway 20 ft. in width, and constructing cinder walk, drains and inlets. Plans, specifications and blank proposals can be obtained at the office of the Chief Engr., Dept. of Pub. Service.

Cleveland, O.—Sealed proposals will be received at the office of the Bd. of Comrs. of Cuyahoga Co., until Jan. 4, 1913, for the improvement of Barton Rd., from Coe Ridge Rd. to westerly county line in Olmsted Twp., in accordance with form of contract and specifications furnished by Frank R. Lander, Co. Surv.

On Dec. 28 bids will be received for the improvement of Gardner Rd. Address John F. Goldenbogen, Clk.

Columbus, O.—Sealed proposals will be received at the office of the State Highway Comr. until Dec. 23 for the following work: (1) Grading and paving with waterbound macadam the Wapakoneta and St. John's Rd., in Duchoquet, Pusheta, Union and Clay Twp., Auglaize Co. Length, 23,500 ft., or 4.45 miles. Width of pavement, 12 ft. Estimated cost, \$14,092.53. (2) Grading and paving with brick the Bridgetown and Ferguson Rd., Green Twp., Hamilton Co. Length, 7,458 ft., or 1.41 miles. Width, 16 ft. Estimated cost, \$29,290.01. (3) Grading and paving with waterbound macadam the Upper Sandusky and Findlay Rd., Crawford Twp., Wyandot Co. Length, 14,003 ft., or 2.65 miles. Width, 16 ft. Estimated cost, \$14,403.14. Plans and specifications are on file in the office of the State Highway Comr. and the State Highway Dept.

Delaware, O.—Ordinances have been passed for the improvement of Webb St., and of Griswold St., between Franklin and Campbell Sts. Both streets are to be graded, curbed, drained and paved—Webb St. with macadam and Griswold St. with vitrified brick, asphalt block or wood block. Address F. D. King, Clk.

Lorain, O.—Resolutions have been adopted by the City Council declaring necessary the paving of E. 29th and E. 30th Sts., between Pearl and Clinton Aves.

An ordinance has been passed to proceed with the improvement of E. 30th St., from the east line of Vine Ave. to the west line of Pearl Ave., by grading, draining, curbing and repaving the same. Address E. E. Bayes, Pres. of Council.

Springfield, O.—A resolution has been passed declaring it necessary to improve Pleasant St., from Yellow Springs St. to the west line of the old Dayton Rd., by grading, curbing, laying sewers, constructing gutters, and paving with vitrified brick or block, sheet asphalt, asphalt block, asphaltic concrete, asphaltic macadam, bitulithic, petripalt or granitoid block, according to the plans, profiles, specifications and estimates in the office of the Dept. of Pub. Service. Address E. D. Seggerson, Clk. of Council.

Steubenville, O.—An ordinance has been passed to improve Superior St., between 7th St. and Highland Ave., by grading and curbing, paving with fire brick, and laying cement sidewalks. Address Hugh W. Patterson, Clk. of Council.

Youngstown, O.—A resolution has been passed in the City Council declaring it necessary to improve Broadway, from State St. east to its termination, by grading, curbing, paving, etc. Address James E. Statler, City Clk.

It has been decided to levy special assessments for the paving of Short St., between Broadway and Emerson Pl. Address M. F. Hyland, City Clk.

Portland, Ore.—The extension of Union Ave. to Columbia Blvd. is assured, according to report submitted by the Com. of the Union Ave. Impt. Club.

Pittsburgh, Pa.—Ordinances have been passed by the City Council as follows: For the grading and paving of Hurd Alley, between O'Neil and Dante Alleys; of Devonshire St., from Wallingford St. to Center Ave., and from Ellsworth Ave. to Bay-

and St. and of Craighead St. between Exchange and Kathleen Sts. Also for the repaving of S. 11th and S. 12th Sts. between Sarah and Brad Sts., and of Sarah and Brad Sts. between S. 11th and S. 12th Sts. Address William A. Mackay, Mayor.

An ordinance authorizing the grading and paving of Water St. from Liberty Ave. to Independence Way and the repaving and repaving of Park Ave. and Exchange Alley, has been referred to the Com. on Pub. Wks.

Wilkes-Barre, Pa.—The Co. Comrs. of Luzerne Co. will, on Jan. 9, present to the Grand Jury a petition for the improvement of county roads in Kingston and Jackson Twp. Surveys, plans and estimates accompany the petition. Address Clk. of Co. Ct.

Abilene, Tex.—About 7 miles of macadam road will be built to connect the county highways which have been completed to the city limits. The \$30,000 bond issue recently voted on will be used for this purpose, together with about \$15,000 now on hand.

Dallas, Tex.—It is understood that bids will be received until Dec. 19 for the construction of 12,312 sq. yds. of brick or wood block pavement, 1,132 sq. yds. cement sidewalks, 2,100 lin. ft. concrete curbing, 1,500 lin. ft. concrete bulkheads, 500 lin. ft. of reinforced concrete drain. Address John D. Kelley, City Secy.

El Paso, Tex.—The City Council has ordered the paving of 11 streets and 2 alleys and the City Clk. has been instructed to advertise for bids, to be opened about Dec. 15. The cost is estimated at \$200,000.

Greenville, Tex.—The City Council is planning the construction of 11 miles of sidewalks and about 6 miles of paving. Address W. A. Frazer, City Clk.

Johnson City, Tenn.—Sealed proposals will be received at the office of the City Comr., until Dec. 19, for constructing sewers, concrete curb and gutter, and street paving with brick, asphalt, bitulithic, Tarriva, asphaltic concrete, wood block, Granitoid or concrete, for Dist. 17, 18, 19 and 20, according to plans and specifications in the office of the City Engr. T. F. McDonald is City Comr.

Knoxville, Tenn.—The Co. Comrs. of Knox Co. have voted to build a pike 14 miles long to connect with an Anderson Co. pike near Andersonville.

Monroe, Wash.—The City Engr. has prepared plans for the paving of 5 blocks of N. Monroe St., between Cora and Alvirview Aves., at an estimated cost of \$16,000.

Montreal, Que.—Plans prepared by the City Engr. call for an expenditure of \$2,275,000 for street paving to be contracted for as soon as the Council has approved the appropriation.

Regina, Sask.—The City Comrs. propose laying 20 miles of concrete sidewalk next year, and to pave 8 miles of streets.

Bids Received and Contracts Awarded.

Birmingham, Ala.—The City Comrs. have awarded to the Southern Bitulithic Co. a contract, at \$22,000, for paving 24th St., between 1st and 8th Aves. The South Asphalt & Construction Co. was awarded a contract for paving a section of Maiden Lane.

San Diego, Cal.—C. H. Tingley has been awarded contracts for grading Alabama St., at \$5,996.16, and 29th St., at \$7,789.73.

La Mesa, Cal.—W. F. Manney & Co., of San Diego, and J. R. McDonald have been awarded a contract, at \$17,910, for grading, paving with granite, and constructing cement curb and gutters on Lookout Ave. The Isbell Construction Co. bid \$18,576, and John Engebretson, \$18,238.

Long Beach, Cal.—Fred Hoffman was awarded a contract, at \$19,400, for the paving and constructing of a lighting system on Pine Ave., from Ocean Ave. to 12th St.

Los Angeles, Cal.—Contracts have been awarded as follows: D. D. Chapman, for improving Channing St. \$7,648.20; Walter Overall, for improving 7th St., \$6,780.55; the Fairchild-Gilmore-Wilton Co., for improving Monte Vista St., \$26,065.10; the Conner Contracting Co., for improving 21st place of oil macadam on the Compton-Clearwater Rd. \$12,351.59; Benjamin F. Ford, for improving Los Angeles St., between 8th and 23d Sts., at 17.3 cts. per sq. ft. for asphalt paving, 30 cts. per lin. ft. for cement curb, 30 cts. per sq. ft. for vitrified block gutter, 40 cts. per granite block gutter, and \$6,900 for culverts.

The Fairchild-Gilmore-Wilton Co. was the lowest bidder for the following jobs: For improving Washington St., from Western Ave. to Arlington St., 17½ cts. per sq. ft. for paving, \$1 per lin. ft. for steel faced cement curb, 35 cts. per lin. ft. for cement curb, 30 cts. per sq. ft. for vitrified block gutter, 40 cts. for granite block gutter, 13 cts. for sidewalk, \$1,670 for culverts. For improving Fremont Ave., between 3d and 6th Sts., 17½ cts. per sq. ft. for paving, 35 cts. per lin. ft. for cement curb, 30 cts. per sq. ft. for vitrified block gutter, 40 cts. for granite block gutter, 13 cts. for sidewalk, \$700 for storm drains. For improving Santa Monica Blvd., between Gower and Townsend Sts., 19.9 cts. per sq. ft. for paving, 35 cts. per lin. ft. for cement curb, 32 cts. per sq. ft. for vitrified block gutter, 12½ cts. for sidewalk, \$2,450 for culverts.

Orange, Cal.—The Los Angeles Paving Co. has been awarded a contract for improving E St., at 15½ cts. per sq. ft. for asphalt paving and 12 cts. for gutters; total, \$17,590.

Redondo Beach, Cal.—The Barber Asphalt Paving Co., of Los Angeles, has been awarded a contract for improving Sunset St., at 15.6 cts. per sq. ft. for asphalt concrete paving and 19 cts. for gutters. Aggregate amount, \$10,000.

Sacramento, Cal.—The Engineering & Constructing Corporation of San Francisco was low bidder, at \$53,991, for improving 10.31 miles of a 15-ft. road in San Diego Co., between Encinitas and Ocean side; and the Ransome Crummy Co. furnished the lowest bid, at \$52,753.56, for improving 14.17 miles of state highway in Merced Co.

San Pedro, Cal.—B. C. Nichols, of Los Angeles, has been awarded a contract, at \$41,748.55, for improving Canal St., between 3d and 7th Sts. The work consists of 123,023 sq. ft. asphalt, 4,110 lin. ft. cement curb, 5,610 sq. ft. granite gutter, and 41,355 sq. ft. sidewalk.

Santa Monica, Cal.—Pearson & Anderson, 1450 Washington Blvd., Venice, have been awarded contracts for improving a portion of Highland Ave., between Central Ave. and Copeland Sq., at \$2.30 per lin. ft. for grading and oiling, 11½ cts. per sq. ft. for sidewalks, 32 cts. per lin. ft. for curbs; and for improving a portion of Central Ave., between 4th and 8th Sts., at \$3.07 per lin. ft. for grading and oiling; 11½ cts. per sq. ft. for sidewalks, and 32 cts. per lin. ft. for curbs.

H. E. Stone, 834 6th St., was low bidder, at about \$96,000, for improving several streets.

Wilmington, Cal.—The Bd. of Pub. Wks. has awarded to B. C. Nichols the contract for paving Canal St., between 3d and 7th Sts., and constructing storm drains in that street. The contract is for \$41,748.55.

De Funiak Springs, Fla.—The Wetumpka Construction Co., of Wetumpka, Ala., was the lowest bidder, at \$990 per mile, for the construction of about 70 miles of sand and clay roads in Walton Co.

Peoria, Ill.—Contracts have been awarded to John McAllister for paving with brick State St., from Prairie to Glen Oak, at \$13,527.98; and Globe St., between Main and State Sts., at \$5,703.50.

Lincoln, Ind.—A contract for gravel road improvement has been awarded to Prettyman & Harness, at \$22,466.

Shelbyville, Ind.—The Co. Comrs. of Shelby Co. have awarded to Hobbs & Cox, of Tipton, a contract for improving 5 miles of the Michigan Rd., in Moral Twp. The price is \$13,040.

A contract to build the George W. Rapp highway in Hendricks Twp. has been awarded to D. H. Fatout, of Indianapolis, at \$6,875.

Iowa City, Ia.—A contract to pave nearly 40,000 sq. yds. of streets with bitulithic and brick has been let to William Harrabin, of Iowa City, for \$91,353.86. The Bryant Asphalt Co., of Waterloo, bid \$92,285.38.

Waukon, Ia.—It is reported that bids will be received until Dec. 20 by the Bd. of Co. Comrs. of Alamakee Co. for constructing two reinforced concrete and steel bridges, one to have a 42-ft. and the other a 120-ft. span. W. H. Miner is Co. Engr.

Joplin, Mo.—The City Council has awarded to More & Anthony a contract for combined concrete curb and gutter on both sides of Main St., between Carter and Christian Sts., at an aggregate sum of \$3,852.

Great Falls, Mont.—Contract has been awarded to the Warren Construction Co.

to pave 1st Ave. north, from Park Drive to 6th St., with bitulithic. The contract price is \$37,901.38.

Frenchtown, N. J.—A contract for the construction of a macadam road from Frenchtown to Flemington has been awarded by the Hunterdon Co. Bd. of Freeholders to Sigapile & Poore, of Reiglesville. The price is about \$77,000.

Cincinnati, O.—A contract has been awarded to Edward Ryan for paving 8th Ave., from Enright Ave. to the new St. Joseph Cemetery, at a cost of approximately \$130,000.

Columbus, O.—Paving contracts have been awarded as follows: (1) Riencapach & Thoma, Fremont, O., \$4,600, for paving with brick the Spiegel Grove Rd., in Ballville Twp., Sandusky Co. Length, 1,336 ft.; width, 12 ft. (2) Wilburn Walls, Latham, O., \$3,475, for paving with water-bound gravel the Grassy Fork Rd. in Mifflin Twp., Pike Co. Length, 11,070 ft.; width, 10 ft. (3) C. S. Slavens, Lucasville, O., \$3,416, for paving with water-bound gravel the Owl Creek Rd. in Union Twp., Pike Co. Length, 10,560 ft.; width, 10 ft. (4) Bope & Polumbo, Columbus, O., \$4,442.40, for paving with water-bound macadam, the Sinking Springs Rd., in Mifflin Twp., Pike Co. Length, 5,280 ft.; width, 12 ft. (5) Northern Construction Co., Bellvue, O., \$5,020, for paving with water-bound macadam the Center Rd., in Bloom Twp., Seneca Co. Length, 5,765 ft.; width, 10 ft.

Portland, Ore.—The Sts. Com. of the Council has recommended granting of the contract to the Montague-O'Reilly Co. for paving with stone blocks 1st St., between Burnside and Davis Sts. The amount is \$8,654.

BRIDGES.

Bids Asked and Prospective Work.

Yuma, Ariz.—At a meeting of the Bd. of Suprvs. it was decided to build a concrete bridge across the Gila River, probably at Wellton.

Sheridan, Ark.—On Dec. 28 Co. Judge McClellan will let a contract for the Saline River bridge at Prattsville.

San Diego, Cal.—Plans have been prepared for a concrete arch bridge to be constructed across University Ave., at Georgia St., at an estimated cost of \$25,000. Edwin M. Capps is City Enr.

San Jacinto, Cal.—The Bd. of Trustees has accepted plans and will advertise for bids for the construction of a bridge across the San Jacinto River at E. Main St. Address Co. Surv.

Yosemite, Cal.—Sealed proposals will be received at the office of the Yosemite National Park until Feb. 1, for the construction of 4 reinforced concrete arch highway bridges as follows: Bridge No. 1, one arch, 105-ft. span, 12½-ft. rise, and 36 ft. clear width. Bridge No. 2, one arch, 20-ft. span, rise 3½ ft., width 17½ ft. over all at crown. Bridge No. 3, same dimensions as No. 2. Bridge No. 4, two arches, 20-ft. span each, rise 3½ ft., and width 17½ ft. over all at crown. Bidders must bid on each bridge separately, but may give a lump bid on all or on any 2 or 3 of the bridges. Plans, specifications, and blank forms of proposal may be obtained on application to Lt.-Col. Wm. W. Forsyth, Acting Supt., Yosemite National Park.

Grand Junction, Colo.—The Co. Comrs. of Mesa Co. plan to replace with steel structures the wooden bridges across Plateau Creek.

Tifton, Ga.—The Bd. of Co. Comrs. of Tift Co. has authorized the construction of a 700-ft. bridge across Little River, on the Eldorado-Omega Rd.

Orofino, Idaho.—The Comrs. of Clearwater Co. have adopted plans and specifications for the construction of a bridge across the Clearwater River at an estimated cost of \$16,000. The Bd. has made an appropriation of \$10,000 for this improvement and expects to get state aid to complete the bridge. Address Co. Audr.

Danville, Ill.—A bridge is to be erected across the North Fork at West Newell. Address Wm. S. Delton, Co. Surv., at Danville.

Chicago, Ill.—Sealed proposals will be received until Dec. 18 for the construction and erection of the sub and superstructure for a highway bridge over the north branch of the Chicago River, at Wilson Ave., according to plans and specifications on file in the office of the Comr. of Pub. Wks., Room 406, City Hall. L. E. McGann is Comr.

Terre Haute, Ind.—The Co. Surv. has submitted to the Bd. of Co. Comrs. the

plans and specifications for the new Hoffman Bridge in Nevins Twp., to consist of a 20-ft. span of concrete and steel. Address Nathan G. Wallace, Co. Audr.

Plans have been ordered prepared for a bridge to cross the Wabash River at Durkes Ferry. Estimated cost, \$70,000.

Council Grove, Kan.—The Bd. of Co. Comrs. of Morris Co. will receive bids until Jan. 8, for the construction of a bridge over the Nishno River. Estimated cost, \$12,000. Address A. E. Smith, Engr.

Whitesburg, Ky.—Letchers Co. will construct 3 bridges at a cost of \$16,000. Address Co. Clk.

Tallulah, La.—The Police Jury will receive bids until Jan. 2, 1913, for the construction of 2 steel bridges—one across Roundaway Bayou, 8 miles south of Tallulah, and one across Bull Calf Bayou, 7 miles north of Waverly. Address W. H. Harvey, Secy.

Taunton, Mass.—The Bd. of Co. Comrs. of Bristol Co. will receive bids until Dec. 17 for the construction of a highway bridge and approaches across the Acushnet River at New Bedford.

Minneapolis, Minn.—The City Council has voted in favor of a plan for the Mississippi River Bridge at 3d St., which calls for a curved structure at a cost of \$1,000,000.

Thief River Falls, Minn.—Until Jan. 8 bids will be received for the construction of a steel bridge with 18-ft roadway over Thief River. Bids may be for one span of 120 ft. with earth fill, or for 2 spans of 100 ft. each. Address A. H. Fasel, Co. Audr.

Joplin, Mo.—Specifications are being considered for a 1,015-ft. viaduct over Broadway. Jesse F. Osborne is Mayor.

St. Louis, Mo.—The Bd. of Pub. Impts. has approved plans and specifications for a new 12th St. viaduct to be constructed at a cost of \$362,000, and an ordinance has been drafted for introduction in the City Council. The bill will provide for a 22-ft. clearance as asked by the railroads, whose tracks pass under the bridge. Address Clk. of the Bd. of Pub. Impts.

Springfield, Mo.—The Co. Ct. will soon ask for bids for constructing a \$1,600 bridge between Wallace and Ash Grove. Address Co. Surv. Fred Johnson.

Hillings, Mont.—Surveys have been completed for a steel bridge over Two Leggin Creek, 8 miles south of Hardin.

McMinnville, Ore.—Bids will be received by Co. Clk. G. W. Jones until Dec. 17, for constructing the superstructure and furnishing steel on a bridge over Willamette River, between Yamhill and Marion Cos. Estimated cost, \$80,000.

Philadelphia, Pa.—Delegations from various improvement associations have petitioned the Mayor for the immediate construction of a temporary bridge over Tacony Creek at Rising Sun Lane.

Wilkesbarre, Pa.—It is announced that the Co. Comrs. of Luzerne Co. are planning to construct a bridge across the river, connecting Wyoming with Jenkins. Estimated cost, \$300,000. Address Co. Audr.

Ft. Worth, Tex.—The State Highway Engr. is preparing plans for 35 concrete bridges, of which it is said that 24 are to be erected in Jewell Co.

Houston, Tex.—The City Council has adopted plans for the proposed San Jacinto St. Bridge.

Courtland, Va.—The Bd. of Supervs. of Southampton Co. will receive bids until Dec. 23 for the construction of 11 steel and concrete bridges as follows: (1) Across swamp near Newsoms; span, 93 ft. 10½ ins. (2) Across Tarrara Creek near Boykin, span, 60 ft. 3 ins. (3) and (4) Across Sunbeam Swamp near Newsoms; spans, 66 ft. 4 ins. and 52 ft. 3 ins., respectively. (5) Across Blackwater River near Ivor; span, 439 ft. 9 ins. (6) Across Three Creeks near Joyner; span, 328 ft. (7) Across Bowers Branch near Burdette; span, 52 ft. 3 ins. (8) Across Nottoway River near Courtland; span, 202 ft. 6 ins. (9) Across Princess Pond near Drewrysville; span, 67 ft. (10) and (11) Across Darden's Mill Stream near Story; spans, 51 ft. 9 ins. and 64 ft. 3 ins., respectively. All these bridges are to have a 12-ft. roadway. Plans and specifications can be seen at the office of the State Highway Comm. in Richmond, Va., or at the office of the Clk. of Circuit Ct. of Southampton Co., at Courtland, Va. Blue prints can be secured from the Childrey-Sunday Co., 919½ E. Main St., Richmond.

Richmond, Va.—Bids will be received until Dec. 21 at the office of the State

Highway Comr. for the construction of 2 concrete bridges over Goose Creek at the towns of Montvale and Irving. Plans and specifications can be obtained at same office or from the Clk. of Circuit Ct., Bedford City.

A resolution has been introduced in the Common Council, calling for a steel or concrete viaduct over Broad St., from 12th to 24th sts. It was referred to the Com. on Sts.

Suffolk, Va.—The Bd. of Supvrs. of Nansemond Co. has authorized the construction of a steel bridge across Bennett's Creek at a cost not to exceed \$6,000.

Newport, Wash.—Plans are being prepared for a bridge to be constructed at Newport connecting Washington and Idaho. It is proposed to have this bridge constructed through joint action of the Idaho and Washington legislatures this winter.

Tacoma, Wash.—Contracts are about to be let for the construction of the following bridges: Yakima Ave. Gulch, estimated cost, \$14,000; S. 30th St., estimated cost, \$3,000, and the N. Oak St. Bridge, estimated cost, \$5,000.

It is reported that bids will be received by the Co. Comrs. until Dec. 21, for constructing 3 bridges on the Stillacoom-Tacoma Scenic Blvd.

Calgary, Alta.—One million dollars will be expended for the construction of a high level concrete bridge spanning the Bow River, and 2 smaller bridges.

Vancouver, B. C.—By-laws have been passed for the construction of the following bridges: Overhead bridge on Carroll St., estimated cost, \$102,000; for the pedestrian ferry subway, \$36,000; Hastings St. Bridge, \$29,860; Keefer St., \$27,570; Harris St., \$12,420, and the Pender St. Bridge, \$21,400.

Toronto, Ont.—Bids will be received until Dec. 20 by Frank Barber, Engr., 57 Adelaide St., Toronto, for constructing 4 steel bridges of 75 ft. clear span in Simcoe Co., near Alliston, Creemore and Beeton.

Bids Received and Contracts Awarded.

Mobile, Ala.—Contract, at \$15,200, has been awarded to the Nashville Bridge Co., Nashville, Tenn., for the construction of a steel draw span, lift type bridge over Dog River at Cedar Point Rd.

Little Rock, Ark.—The Bd. of Pub. Affairs has awarded to Hannan & Hickey, of St. Louis, a contract, at \$83,034, for the construction of the 3d St. viaduct. Other bids were: Kansas City Bridge Co., Kansas City, Mo., \$92,632; Austin Bros., Dallas, \$92,293; Gould Construction Co., Davenport, Iowa, \$91,785; Mississippi Valley Construction Co., \$98,584; William P. Carmichael Co., St. Louis, \$92,334.20; Fox Construction Co., El Reno, \$93,865.50; Reinhart & Donovan, Oklahoma City, \$86,078; J. A. Omberg, Jr., Memphis, \$91,322; Gibson & Dillingham, Little Rock, \$88,908; Stewart & McGehee Construction Co., Little Rock, \$94,297.20; Oklahoma City Construction Co., \$88,542.

Venice, Cal.—It is reported that a contract for constructing approaches to the W. Main St. Bridge over the Ventura River has been awarded to H. C. Mayer, of Venice, for \$27,395.

Marysville, Cal.—Contract has been awarded the Portland Concrete Pile Co. for building a reinforced concrete bridge over the Yuba River at Park's Bar. The bridge is to be 624 ft. long and 18 ft. wide, and the contract price is \$38,450.

Caldwell, Idaho.—Forbes & Co., of Caldwell, hold contracts to build 10 bridges over rivers and creeks in Canyon, Washington and Adams Cos., at an aggregate cost of \$75,000.

Lewiston, Idaho.—Contract for the construction of a steel bridge across the Clearwater River has been awarded to the Security Bridge Company of Minneapolis, at \$47,500.

Chicago, Ill.—The following bids have been received for constructing the superstructure of the Chicago Ave. Bridge: The Ketter-Elliott Erection Co.: (a) Superstructure complete, \$154,500; (b) filling in approaches (300 cu. yds.), \$1 per cu. yd.; (c) concrete curbs and steps (50 cu. yds.), \$13.50 per cu. yd.; (d) brick paving (650 sq. yds.), \$3 per sq. yd.; total, \$157,425. Brobel Steel Construction Co.: (a), \$159,800; (b), \$2; (c), \$15; (d), \$4; total, \$163,750.

Placerville, Ky.—Contract for a bridge across the Cumberland River is said to have been let to the Roanoke Bridge Co. at a price approximating \$15,000.

Old Town, Me.—A contract for the construction of the superstructure of a 208x30x6 ft. highway bridge has been awarded to the Penn Bridge Co., of Beaver Falls, Pa., at \$21,490; and another contract for the masonry has been let to Hartwell & Connors, of Old Town, Me., at \$9.50 per cu. yd. for concrete and \$1.50 per cu. yd. for wet excavation.

Twain Bridges, Mont.—It is stated that the Continental Bridge Co., of Chicago, Ill., has been awarded the contract for the construction of a steel bridge over the Jefferson River near here.

New Brunswick, N. J.—Contract has been awarded to John F. McGovern, New Brunswick, for the construction of a concrete and steel bridge across Keasby Creek at Keasby Ave., Woodbridge Twp. Contract price, \$5,060.

Albany, N. Y.—The State Bd. of Pub. Wks. has awarded to Barrally & Ingersoll, of Rochester, contract for the construction of a bridge over the Oswego River and Barge Canal at Phoenix, N. Y. The contract price is \$198,000.

Charlotte, N. C.—The Co. Comrs. of Mecklenburg and Lincoln Cos. have awarded to the Virginia Bridge & Iron Co., of Roanoke, Va., a contract for building a steel bridge across the Catawba River, connecting the two counties. The bridge will be 689 ft. long, and the cost \$18,038.

Philadelphia, Pa.—The contract for the construction of the Westmoreland St. foot bridge was awarded to Frank J. Boas for \$4,165.

BONDS.

Montgomery, Ala.—Bonds for approximately \$75,000 will be issued early in January to pay for the improvement of several streets.

New Decatur, Ala.—Four thousand dollars in bonds has been voted for paving purposes. Address Mayor.

Cartersville, Ga.—The Grand Jury has recommended that the Co. Comrs. submit to the vote of the people a bond issue of \$100,000 for road work.

Hawesville, Ky.—Three districts of Hancock Co. have voted road bonds as follows: Grant, \$25,000; Butler, \$125,000; Poe, \$100,000.

Middlesboro, Ky.—An Advisory Bd., appointed by the Fiscal Ct., has called an election for March 4, 1913, to vote on a \$350,000 road bond issue.

Annapolis, Md.—Bids will be received Jan. 2 for the purchase of \$1,150,000 10 to 15 year 4 per cent. public highway bonds. Address E. C. Harrington, Compt.

Charlotte, Mich.—Six thousand dollars in bonds has been voted for opening 2 streets. Address Horace S. Maynard, Mayor.

Collins, Miss.—A road bond election will be held on Dec. 19.

Lorain, O.—An ordinance is before the Council providing for an issue of \$75,000 bridge bonds. Address E. P. Keating Audr.

Monroe, Mich.—An election will be held next February to vote on the question of issuing \$25,000 paving bonds. Address City Clk.

Traverse City, Mich.—Paradise Twp., Grand Traverse Co., has voted to issue \$30,000 highway bonds. Address Co. Surv. E. P. Waterman, at Traverse City.

Cleveland, O.—Bids will be received Dec. 26 for the purchase of \$175,000 4 per cent. improvement bonds. Address Thomas Coughlin, City Audr.

Rawson, O.—Until Dec. 24 bids will be received for the purchase of \$9,671.4 per cent. paving bonds, payable 1915-1923 inclusive. Address Chas. H. Fetzner, Village Clk.

Strongsville, O.—Until Dec. 30 bids will be received for the purchase of \$7,000 twp. highway impt. bonds, payable in 2 to 7 years. Address R. Gibbons, Clk.

Toledo, O.—On Dec. 18 bids will be received for the purchase of \$185,000 bridge bonds, and \$114,500 improvement and extension bonds. Address J. J. Lynch, City Audr.

MISCELLANEOUS.

New York, N. Y.—Sealed bids will be received by the Comr. of Bridges at Nos. 13 to 21 Park Row, New York City, until Dec. 19, for the improvement of the Manhattan plaza of the Manhattan Bridge. Blank forms and specifications may be obtained at above office.

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California Highway Bulletin

In order to meet the demand for authoritative information regarding the work done and that planned, the California Highway Commission has decided upon the issuing of bi-monthly reports. These are to be published under the name "California Highway Bulletin," as state documents, and mailed to those interested, upon application.

The first report, designated as Vol. I, No. 1, and dated Oct. 15, has recently been issued. It is 9 by 12 ins. in size and contains 16 pages and several excellent illustrations showing various phases of highway activity in the state. Among the principal features of the first number are the following: "Save the Native Trees Along the Highway"; "Routing the California State Highway"; "The Engineering Department"; "Counties Provide Rights of Way and Bridges"; "Employees Appointed Solely on Merit"; "One Thousand Miles of Highway Surveyed," and "A Statement From the Highway Engineer." In addition to these, there are several short articles on various matters pertaining to the work of the commission. Much of the matter contained in the bulletin was presented in a condensed form in a paper entitled "California's State Highway," presented by Austin B. Fletcher at a meeting of the Pacific Highway Association in San Francisco, Cal., on Aug. 5 of this year and printed in "Good Roads" for Sept. 7, 1912.

The first article listed above—"Save the Native Trees Along the Highway"—is a plea for the preservation of native trees growing along the state highway route, made in pursuance to the following resolution, which was adopted at the September session of the Highway Commission:

Voted, That it be the policy of the Commission that standing timber on rights of way of state highways in the forest districts of the State be preserved and that rights of way be acquired with the standing timber thereon, and that landowners be encouraged to leave timber uncut for a considerable distance on both sides of state highways in order to enhance the scenic beauty and attractiveness through wooded portions of California.

In many parts of the state assurance has been given the Commission that the timber on the rights of way will go to the state and that the timber for 100 ft. on each side of the rights of way will also be dedicated to the public and preserved. Efforts are being made to secure such action in all of the counties.

"Routing the California State Highway" is a discussion of the problem of laying out the roads to be built under the highway law; and includes an opinion rendered by the Attorney General of the state confirming the position taken by the Commission. The state highway act of 1909 provided that:

The route or routes of said state highways shall be selected by the Department of Engineering, and said routes shall be so selected and said highways so laid out and constructed or acquired as to constitute a continuous and connected state highway system running north and south through the state, traversing the Sacramento and San Joaquin valleys and along the Pacific coast by the main, direct and practicable routes, connecting the county seats of the several counties through which it passes and joining the centers of population, together with such branch roads as may be necessary to connect therewith the several county seats lying east and west of such state highway.

Considerable doubt was entertained by the commission as to the precise meaning of this section, and it was found

that even with the aid of expert lawyers it was difficult to interpret the law. In addition, two different and opposite policies were urged upon the commissioners, and it was found that they must either select the route of the main highway by "the most direct and practicable route" as provided by the act, ignoring county lines and local interests and keeping in mind only the needs of the state as a whole, or else must lay out the road as a series of county links, each of which would fulfill the functions of a county road better than those of a state route. The commissioners brought the matter before the people of the different parts of the state in various ways, and it was ascertained that public sentiment was strongly in favor of the laying out of the trunk lines of the state highway system by the shortest and most feasible routes. In accordance with this, the commission proceeded to determine upon the routes and to commence work. Difficulty was encountered, however, in Tulare and King Counties, the residents of both county seats desiring the route to pass through those places. One of these lies almost due west of the other and about 20 miles distant, and it was considered inadvisable to so route an approximately north and south highway as to pass through both. The commission, therefore, decided upon a location passing between the two towns, with the intention of providing a lateral road to each of them. The disappointed communities brought the matter to the attention of Governor Johnson, who referred it to Attorney General Webb, in July. On Aug. 22 he transmitted to the governor an opinion which sustained the position taken by the Highway Commission, in all respects. The opinion takes up the matter in great detail and is printed in full in the bulletin.

Under the heading, "The Engineering Department," a full explanation is given to the organization of the Engineering Department, of which the Highway Commission is a part. This has been explained in a previous number of "Good Roads" and will not be taken up here.

An account of the manner in which various counties have responded to the request of the Highway Commission that they provide, free, rights of way for the roads of the state highway system is presented under the heading "Counties Provide Rights of Way and Bridges." The routes of the two main highways, according to the bulletin, may be considered as having been practically determined. One of these is generally known as the central or valley highway and the other as the coast route. Of the 26 counties on the direct route, only two, it is stated, evinced any reluctance in providing rights of way and constructing necessary bridges at their own expense, and of the 22 remaining counties which will have to be reached by laterals, 12 have already filed with the commission formal and unconditional pledges to procure the rights of way and build the bridges.

The article entitled "Employees Appointed Solely on Merit" includes a roster of the commission for the month of September and a statement of the method by which all employees are appointed. A table similar to that in the bulletin was printed in Mr. Fletcher's paper "California's State Highway," to which previous reference has been made, in which reference was also made to the system employed in selecting employees.

The article entitled, "One Thousand Miles of Highway Surveyed" comprises a statement of the first year's work on the nine main routes in the state system which have a total length of about 2,300 miles. In the construction of these roads, the width of roadway and the type of surface have been varied considerably to meet local conditions. Nearest the city of San Francisco, where there is extremely heavy traffic, provision has been made for the construction of sheet asphalt pavement, 24 ft. wide, with earthen shoulders, while in some of the mountainous sections the roads will be graded to a width of only 18 ft. and will not be paved. The usual width of pavement, it is stated, will be 15 ft. and the minimum width of shoulders 3 ft. Of the total 2,300 miles of road included in these main routes, 1,000 miles have been surveyed and practically 152 miles have been laid out as state highway. Of the latter, 115 miles are under contract and, at the date of the report, 32 miles were advertised for contract. The character of surface to be employed for the roads which have already been laid out is shown in the following table:

Sheet asphalt on concrete base.....	5.4 miles
Sheet asphalt on macadam base.....	6.4 miles
Hydraulic concrete with oiled surface.....	103.9 miles
Macadam with oiled surface.....	18.9 miles
Grading (no pavement).....	12.8 miles
Miscellaneous.....	4.4 miles
Total	151.8 miles

There is also included a table showing the status of the work on each of the nine routes.

Three pages of the bulletin are taken up by a communication from Highway Engineer Fletcher ("A Statement from the Highway Engineer; Comments on the Municipal League Committee's Report"). This statement is in the form of a report to the California Highway Commission, and in it Mr. Fletcher takes up in detail the criticisms of the Highway Commission and its work made in a report of a committee of the League of California Municipalities dated Aug. 22, 1912, and presented to the league at its convention held at Berkeley during the last week of September.

The specific criticisms which Mr. Fletcher takes up are four in number, the first being the disapproval of "oil macadam" on the part of the committee. Mr. Fletcher states in reference to this that he believes that when properly constructed this pavement is worthy of recognition as a pavement for rural highways. He says, however, that the inference drawn by the committee from the paper delivered by him before the Pacific Highway Association in San Francisco in August, that this type is to be made more or less standard throughout the state, is not correct. The next is the objection made in the report that the asphalt wearing surface specified for a road in San Mateo County was too thin. In reply to this, Mr. Fletcher states that while 1½ ins. of sheet asphalt is the minimum thickness usually specified for city street work, the 1-in. surface specified for the San Mateo work is sufficient for the rural road in question. The third criticism in the report was in regard to concrete foundations, the committee calling attention to the difficulty of securing good concrete under adverse conditions on highway work and calling such a base, regardless of its thickness, impracticable. In reply, Mr. Fletcher agrees that a concrete base of any thickness must be put down with the greatest of care and must be properly protected until it has been covered, but contends that good work can be secured by the engineers and contractors engaged in the work even under adverse conditions. He also points out that the concrete specified is a richer mix than is customarily used for a pavement foundation. The last point taken up by Mr. Fletcher is the advocacy of the committee of the asphalt concrete type of pavement for general use. Mr. Fletcher states that, while he agrees that it is an excellent pavement, he prefers a road with a hydraulic cement base to one consisting wholly of bituminous concrete. He also gives figures showing

that the so-called oiled concrete built by the commission, taking into account maintenance cost, is cheaper than either the asphalt concrete or the sheet asphalt type.

In conclusion, Mr. Fletcher states that: "The pith of the criticism is that the commission is trying to do too much work that the committee is pleased to call 'mediocre' in an endeavor to complete the state highway system within the sum appropriated, namely, \$18,000,000." It is virtually recommended in the report of the Municipal League committee, he says, that the requirements of the state highways act be disregarded and that the commission go on with its work, paying no particular attention to the entire mileage, but paving the main lines with a sheet asphalt on a heavy concrete base or with the so-called asphaltic concrete. Such work, he holds, would be unnecessarily substantial and its cost would make it impossible for the commission to complete the system laid out.

Other articles in the bulletin discuss the freight and material contracts made by the commission with various railroads, the question of patented pavements, the building of highways through cities, the matter of warning signs for torn up roads, and other matters of interest.

Meeting of the Kansas State Good Roads Association

As a result of the annual meeting of the Kansas State Good Roads Association held at Independence, December 9, 10 and 11, an active campaign for new highway legislation will be conducted in Kansas during the coming year.

Among the resolutions adopted at the meeting was one recommending a state highway commission composed of the Board of Regents of the State Agricultural College and a staff of engineers and clerks. Other resolutions provided for the appointment of a road patrolman in each township; the institution of state examinations for county surveyors and engineers; the making of a unit of each county in road construction; the registration by the state of motor vehicles and the elimination of local automobile taxes; the employment of penitentiary, reformatory, city and county jail prisoners in road work, and the establishment of a steel fabricating shop at the penitentiary as part of a plan for furnishing and erecting bridge superstructures in the counties and towns at cost. Federal aid in the construction of highways, was also endorsed by resolution.

The delegates favored the repeal or revision of the present bridge law; the establishment of a course in highway engineering at the State Agricultural College in Manhattan, and the placing of good roads primers in the public schools.

In answer to appeals taken by coal companies in Westmoreland County, Pa., from assessments levied against their properties by the several township supervisors for road purposes, Judge John W. Reed decided against the appellants. The companies asked for an abatement of taxes on land where the coal had been mined. These taxes were levied at the meeting of the supervisors in December, 1911, and the appeal was taken in May, 1912. It was contended by the supervisors that the appeal had been taken too late, and that the valuation from which the levy was made was a correct one. A master was appointed and approved the opinion of the supervisors. An appeal was then taken to court and a test case was made of the appeal of the Pittsburgh Coal Co. against Rostraver township. The court sustained the decision of the master.

A series of lectures on road building will be given during January at the agricultural college in Nova Scotia. The lectures will be provided by the Public Works Department of the province of Nova Scotia and will deal principally with the improvement of ordinary country roads.

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DECEMBER 21, 1912

Indiana Better Roads Convention

The Indiana Better Roads Convention was held at the German House, Indianapolis, December 11, 12 and 13. It was held under the joint auspices of the Indiana Good Roads Association, the Indianapolis Commercial Club, the Indianapolis Board of Trade, the Indianapolis Trade Association, the Indianapolis Automobile Trade Association, the Indianapolis Merchants' Association, the Manufacturers' Association of Indianapolis, the Indiana Engineering Society, the Hoosier Motor Club, the Indianapolis Clearing House Association and the Indiana Federated Commercial Clubs.

The primary object of the convention, aside from the general promotion of the cause of good roads in the state, was the consideration of bills bearing on highway improvement to be presented at the next session of the Legislature. The sessions on the first day were devoted to "National Highways"; those on the second to "Road Construction, Upkeep and Repairs," and those on the third to "Legislation, Administration and Finance."

The first session of the convention was opened by Clarence A. Kenyon, President of the Indiana Good Roads Association and of the convention. The first speaker was Thomas R. Marshall, Governor of Indiana and Vice President-elect of the United States, who welcomed the delegates on behalf of the state of Indiana. Following Governor Marshall, Newton J. McGuire of the city legal department gave an address of welcome in behalf of the city of Indianapolis, speaking in place of Mayor Samuel L. Shank who was unable to be present. Mr. McGuire was followed by John W. Holtzman, who welcomed the delegates on behalf of the commercial organizations. Former Vice President Charles W. Fairbanks, had been selected to make this address, but was unable to attend. Hon. William P. O'Neil of Mishawaka, Lieut. Governor-elect of Indiana, responded on behalf of the state.

The second session which opened in the afternoon of December 11 was presided over by Charles A. Bookwalter. The first address of this session after the opening one, was delivered by W. J. Ward, chairman of the good roads committee of the Rural Letter Carriers' Association, who spoke on the subject "Post Roads from the Rural Carriers' Standpoint." Mrs. Caleb S. Denny of Indianapolis, chairman of the highway committee of the Daughters of the American

Revolution, spoke on the "National Trail." An address on the "Old Trails Ocean-to-Ocean Highway," was delivered by Judge J. M. Lowe, of Kansas City, Mo., President of the National Old Trails Ocean-to-Ocean Highway Association.

In the evening an illustrated lecture on the "Roads of the Old World" was given by M. O. Eldridge of the U. S. Office of Public Roads, Washington, D. C.

The third session, on the morning of December 12, was presided over by Marcus R. Sulzer of Madison, acting in place of Prof. H. K. Hatt, Professor of Engineering at Purdue University. A paper on the subject, "Indiana Good Roads Association's Plan for Maintenance of County and Township Roads" was read by C. A. Kenyon, President of the association. He was followed by D. Ward King, of Maitland, Mo. A general discussion was led by C. F. Hunt of Lafayette, Ind.

At the fourth session on the afternoon of December 12, Charles C. Brown, of Indianapolis, Editor of "Municipal Engineering," presided. After the opening address, Prof. G. I. Christie, Superintendent, Department of Agricultural Extension, Purdue University, spoke on the topic "The Farmer's Needs," taking up the subject in the subdivisions "Better Agricultural Education," "Improved Soil Fertility" and "Better Roads." A. H. Beardsley of Elkhart, Ind., was scheduled to read a paper on the subject "What is the Matter with Indiana Roads," but was unable to be present, and James E. Bell, of Elkhart, read the paper. Paul D. Sargent of the United States Office of Public Roads, spoke on the work of the office, and Joshua Strange, President of the State Farmers' Congress of Indiana, read a paper on the subject "Relation of the Farmer to the Highways."

The delegates were entertained in the evening at a smoker at the German House. W. S. Gilbreath acted as chairman.

The fifth and sixth sessions, those on "Legislation, Administration, and Finance," were conducted under the auspices of the Indiana State Bar Association. Frank E. Gavin, President of the Association, presided, and the various phases of highway improvement were discussed.

An exhibition of road and street building machinery and materials was held in connection with the convention. The U. S. Office of Public Roads exhibited historic models showing the various steps in the evolution of road building. Other exhibits were made by the Universal Portland Cement Co., Chicago, Ill.; the Indiana State Stone Club; the Bessemer Limestone Co., Youngstown, O.; the Crawfordville Corrugated Culvert Co., Crawfordville, Ind.; the Dolarway Paving Company, New York, N. Y.; the Emerson-Brantingham Implement Co., Rockford, Ill.; the Good Roads Machinery Co., Fort Wayne, Ind.; the Westrumite Company, Whiting, Ind.; the National Paving Brick Manufacturers' Association, Cleveland, O.; the Dunn Wire-Cut-Lug Brick Co., Conneaut, O.; the W. O. O'Neil Co., Crawfordville, Ind.; A. B. Meyer & Co., Indianapolis, Ind.; the Barrett Manufacturing Co., Philadelphia, Pa.; J. D. Adams & Co., Indianapolis, Ind.; the Shannon Inter-Locking Metal Culvert Co., Cincinnati, O.; Purdue University; the Warren Bros. Co., Boston, Mass.; and the Republic Creosoting Co., Indianapolis, Ind.

Large Majority Favor Bond Issue

The final returns from practically all sections of New York State show that the total majority of votes in favor of the \$50,000,000 bond issue, which was submitted to the people at the election November 5, was 403,768. This result is based on the exact figures from every county except Kings and Queens and an estimation from these counties. The issue carried in every county.

New York County returned a majority of 105,492, in spite of the fact that there were 102,999 blank ballots in that county.

Coming Meetings

Jan. 21-23.—American Wood Preservers' Association.—Annual Convention, Chicago, Ill. Secy., F. J. Angier, B. & O. R. R., Baltimore, Md.

Personal Notes

Matthew Patton, formerly Chief of the Bureau of Highways, Philadelphia, Pa., died at his home in that city on Nov. 30.

C. D. O'Callaghan, for the past eighteen years Assistant City Engineer of Joliet, Ill., has been appointed City Engineer to succeed H. A. Stevens.

Robert J. Harding has resigned as Superintendent of Public Works of Poughkeepsie, N. Y., to engage in private practice as consulting engineer.

G. C. Langenheim, of Pittsburg, Pa., has been appointed assistant engineer in the State Highway Department of Pennsylvania. He was formerly superintendent of state roads in Allegheny County, Pa.

Arthur N. Johnson, M. Am. Soc. C. E., State Highway Engineer of Illinois, on December 13, delivered an illustrated lecture on "Cement Concrete Highway Bridges" before the graduate students in highway engineering at Columbia University, New York City.

Hibbard Atwill Paine, Assoc. M. Am. Soc. C. E., of Denton, Md., for the past four and a half years Road Engineer for Caroline County, Md., has resigned his commission to take effect Mar. 1, 1913. Mr. Paine was identified with railroad location in various parts of the United States for seventeen years previous to his road work in Maryland.

Keyes C. Gaynor, formerly city engineer of Sioux City, has been engaged to make a preliminary survey for a bridge across the Missouri River, from the foot of Pearl street, Sioux City, to South Sioux City. The local Commercial Club is backing the project to build a free bridge. The cost of the proposed structure has been estimated at between \$160,000 and \$180,000.

General Notes

Plans are being made in San Diego, Cal., for the paving of University Ave. from the eastern limits of San Diego through the towns of East San Diego and La Mesa.

The Road Commission of Berrien County, Mich., is reported to have agreed upon a plan for the network of highways to be constructed throughout that county from the proceeds of a

\$500,000 bond issue to be voted upon next April.

An experimental strip of concrete paving laid on the Richfield Road, Minneapolis, at a cost of about \$1.20 per square yard, is said to have moved so satisfactory that concrete will probably be used on a number of Minneapolis streets.

The Good Roads' Association of Southern Oregon has prepared a bill for presentation to the legislature giving the County Courts the power to submit to the voters any measure calling for the issuance of bonds, provided a petition signed by 10 per cent. of the voters is presented.

At a session of the County Commissioners on Dec. 4, Athens County, O., was divided into eight pike road districts, each of which is to be superintended by a competent road man. The Commissioners believe this method will insure higher efficiency in the maintenance of the roads.

Walla Walla County, Wash., has now about 150 miles of "straw" roads—that is, mud roads covered with about 6 ins. of straw which, when it has been forced down by traffic, is supplemented with an additional layer of straw. Sagebrush is similarly used, and the comparative excellence of such roads, together with their cheapness, make them very popular.

A 5,000-foot stretch of concrete highway has been opened to traffic at New Village, Warren County, N. J. It has been laid experimentally in an endeavor to find a road material that will stand heavy traffic where the swampy nature of the underlying soil makes it impossible to keep macadam roads in good condition.

Various counties in Mississippi are raising funds for road building in 1913. Forrest County has voted \$100,000 in bonds for roads leading into Hattiesburg; Lincoln County intends to issue \$50,000 in bonds for roads leading into Brookhaven; Amite County will sell bonds to the amount of \$40,000, and Adams County has passed an order for the issuance of \$100,000 in bonds for road purposes.

Representatives of practically all the counties in Arkansas between Little Rock and Memphis, Tenn., met in Forrest City, Ark., Dec. 10, and organized the Cross-State Highway Association. Dr. E. E. McKnight, of Brinkley, was elected President; Judge E. A. Rolfe of Forrest City, Vice President, and Dr. J. O. Rush, of Forrest City, Secretary and

Treasurer. The object of the association is to promote plans for building a highway across the state of Arkansas.

A petition is being circulated in Clinton County, Ky., for the calling of a bond election on March 29, 1913, to vote on issuing bonds to the amount of \$50,000 for building turnpikes in that county.

Trade Notes.

The Robeson Process Company has transferred its general office from Au Sable Forks, N. Y., to Pennington, N. J.

The Texas Road Supply Co. has been incorporated at Wichita Falls, Tex., with a capital stock of \$50,000. The incorporators are A. H. Brittain, R. E. Huff and G. D. Anderson, all of Wichita Falls.

The Hurley Asphalt Co. of Woodford, Tex., has incorporated with a capital stock of \$50,000. J. E. Parker, of Woodford, and W. R. Hurley and F. M. Brooks of Ft. Worth, are the incorporators.

The Austin Manufacturing Company, of Chicago, has issued a 70-page catalogue illustrating and describing its gyratory rock and ore crushers, motor road rollers, graders, screens, portable crushing outfit for country roads, etc.

A catalogue issued by the Gardner Crusher Co., of New York, contains descriptions of that company's rock crusher, disintegrator and pulverizer. It is liberally illustrated with sectional cuts and diagrams.

Bulletin No. 58-O, issued by the Sullivan Machinery Company, of Chicago, contains illustrations and descriptions of portable drilling outfits designed for rock excavating in road work, trench digging, etc., manufactured by the company.

The Sullivan Bridge Co. of Indianapolis, Ind., has incorporated with a capital stock of \$25,000 and the company's plant will be enlarged. Robert Taylor is President; M. R. Gustin, Vice President, and Thomas J. Walls, Secretary and Treasurer.

Roy D. Hunter, general sales manager of the Sullivan Machinery Co., Chicago, Ill., has resigned and Howard T. Walsh, who has been the European agent of the company with headquarters in London, has been appointed Mr. Hunter's successor. Austin Y. Hoy, the company's representative at Spokane, Wash., succeeds Mr. Walsh in Europe, and Louis R. Chadwick of the St. Louis office has been designated Mr. Hoy's successor in Spokane.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

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12-24 New York, N. Y., paving.....	12-21
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ROADS AND STREETS.

Bids Asked and Prospective Work.

Gadsden, Ala.—The Co. Comrs. of Etowah Co. are considering calling for state aid to construct a model highway from Altalia to Steele, in St. Clair Co.

Montgomery, Ala.—Bids will be received Dec. 24 for paving sidewalks on both sides of part of High St. with Schilling paving. Address Robert Tait, City Treas.

Fullerton, Cal.—The Rd. Comrs. are studying various kinds of paving with a view to selecting that best adapted for the paving of 9½ miles of streets during the coming year.

National City, Cal.—The Bd. of Trustees has ordered the paving of sections of National Ave., the pavement to be concrete and asphalt, between 1st and 6th Sts., and granite from 13th St. to the city limits. From 13th St. to 32d St. the width will be 40 ft., and for the remainder 30 ft.

San Francisco, Cal.—The Bd. of Pub. Wks. has granted permission to property owners to let private contracts for street work as follows: Grading and curbing 27th Ave., between Balboa and Cabrillo Sts.; Sadowa St., between Capitol and Plymouth Aves., and Capitol Ave., between Sadowa and Broad Sts. Curbing and paving 22d Ave., between California and Clement Sts.; Edinburgh St., between Peru and Avalon and between Excelsior and Brazil Aves., and Silver Ave., between Hission and Lisbon Sts.

Pueblo, Col.—The City Eng. has prepared plans for paving. D. P. Gaymon is City Eng.

Hartford, Conn.—The plans of the Street Bd. call for the macadamizing of about 3 1-5 miles of streets in 1913.

Clearwater, Fla.—City Eng. H. B. Anschutz has prepared plans for street improvements.

St. Petersburg, Fla.—Three hundred and seventy thousand dollars will be expended constructing roads. Address Chman. of the Bd. of Pinellas Co. Comrs.

Boise, Ida.—The council will advertise for bids for 80,000 sq. yds. of paving. The material to be used is not decided. Address City Eng.

Peoria, Ill.—Estimates on the cost of two stretches of paving have been submitted to the Bd. of Loc. Imps. by City Eng. Leonard Jeffries. One calls for the paving of Fulton St. with brick between Jefferson and Franklin Sts. at a cost of \$15,052. The other calls for the paving with brick of Fayette St., from Water St. to Knoxville Ave., at a cost of \$25,027. Address City Eng. Leonard Jeffries.

Rockford, Ill.—Kilbourn Ave. will be paved with brick. Address City Engr.

Waukegan, Ill.—The City Council has decided to pave Grand Ave., at a cost of \$44,298.25; Butrick St., at \$3,096.33, and Spring St., at \$4,580.20.

The City Eng. has prepared plans for paving Washington St.

Columbia City, Ind.—Five petitions for macadam roads in Cleveland Twp. are

now before the Bd. of Co. Comrs., and favorable action is expected.

Kansas City, Kan.—Resolutions have been passed by the City Council providing for grading 36th St. between Strong and Powell Aves. and for curbing 22nd St. between Stewart and Troup Aves. with artificial stone.

Baltimore, Md.—According to plans under consideration by the Comrs. for Opening Sts., 11 new streets will be opened and \$420,516.71 spent on paving work in the Annex next year.

Marquette, Mich.—An appropriation of \$47,000 has been granted the Marquette Co. Road Comrs. for work on the county's highways during the coming year. The amount will be apportioned as follows: Road south of Marquette, \$10,000; road west of Ishpeming, \$20,000; maintenance, \$5,000; repair of portions of the roads not provided for in the appropriation, \$3,500; superintendence and engineer, \$6,500.

Chillicothe, Mo.—The Council is preparing to pave several streets. Address Mayor.

Kingston, N. Y.—The Bd. of Supvrs. of Ulster Co. has adopted resolutions for the construction of 18½ miles of macadam roads in Marlboro, Plattskill, Esopus and Shandaken Twps.

Lyons, N. Y.—The Bd. of Supvrs. of Wayne Co. has adopted resolutions requesting the State Highway Comn. to construct state highway No. 20 from Lyons to Newark and to furnish plans, specifications and cost estimates of 1.4 miles of highway on the Lyons-Sodus Point Rd., at Alton.

New York, N. Y.—Sealed bids will be received by Maurice E. Connolly, Pres. of the Boro. of Queens, at his office in Boro Hall, Long Island City, until 11 a. m., Dec. 24, for the following street work: Furnishing, delivering and erecting 500 new street signs and posts, where directed, in the Borough of Queens; paving with (a permanent pavement) asphalt block on a concrete foundation, together with all work incidental thereto, in Radde St., from Payntar Ave. to Webster Ave., 1st Ward; regulating, grading the sidewalk spaces, curbing and laying sidewalks (where not already laid to grade and in good condition) and all work incidental thereto, in Jackson Ave., from Junction Ave. to 54th St., 2d Ward; regulating, grading, curbing, recurling, flagging and reflagging with bluestone and paving with (a permanent pavement) asphalt blocks on a concrete foundation, together with all work incidental thereto, in the Boulevard, from Webster Ave. to Washington Ave., 1st Ward; regulating and paving with improved granite blocks (permanent pavement) on a concrete foundation, together with all work incidental thereto, in Cypress Ave., from Myrtle Ave. to Cooper St., 2d Ward; regulating, grading and paving with (a permanent pavement) asphalt blocks on a concrete foundation, together with all work incidental thereto, in Prospect St., from Payntar Ave. to Beebe Ave., 1st Ward.

Sealed bids will be received by George Cromwell, Pres. of the Boro. of Richmond, at his office in Boro. Hall, St. George, New Brighton, until noon, Dec. 24, for the following street work: Furnishing all the labor and materials required for regulating and repaving with napped granite block pavement on concrete foundation the roadways of Broad St., from Gordon St. to Van Duzer St., and other streets, together with all work incidental thereto; furnishing all the labor and materials required for regulating and repaving with bituminous concrete pavement on present macadam foundation the roadways of Granite Ave., from Richmond Terrace to Cedar St., and other streets, together with all work incidental thereto; furnishing all the labor and materials required for regulating and repaving with wood block pavement the roadways of Broadway, from Union St. to Henderson Ave., and other streets, together with all work incidental thereto.

Akron, O.—Resolutions have been passed for the improvement of Kenyon St. and Prince William Alley. Address Ira A. Priest, Clk. of City Council.

Canton, O.—An ordinance has been passed determining to proceed with the improvement of Marvin Ave., from Garnet St., by grading, setting curbing, laying flagstone sidewalks, constructing vit-

rified block crosswalks and gutter, paving and providing the necessary drainage. An ordinance has also been passed determining to proceed with the improvement of Prescott Ave. to Fulton St., by grading, setting curbing, flagstone sidewalks, vitrified block crosswalks and gutter, paving and providing the necessary drainage.

Cleveland, O.—A resolution has been adopted for the grading, draining, curbing and paving of Larnder Ave., between W. 95th and W. 98th Sts.

Coshocton, O.—Petitions are being circulated among land owners for the improvement of the Cadiz Rd. for a distance of 1 mile east and 1 mile west of West Lafayette.

Dayton, O.—Ordinances have been passed by the City Council as follows: To levy special assessments for the improvement of Bolender Ave., from Cincinnati St. to Broadway; determining to proceed with the improvement of the alley west of Summit St., from Germantown St. to Gold St.; to levy special assessments for the improvement of Miami Chapel Rd., from Broadway to the Big Four Railroad; declaring it necessary to improve Stafford Ave., from Third St. to alley south of Third St.; to levy special assessments for the improvement of Cincinnati St., from Miami Chapel Rd. to Bolender Ave.

Dennison, O.—A resolution has been passed declaring the necessity of improving Miller Ave., from Woodland to Gardner Aves., in the village of Dennison, by grading, paving and curbing.

Hillsboro, O.—The Co. Comrs. of Highland Co. have granted a petition for a new pike in Whiteoak and Clay Twps. The pike will start near the Taylorsville Bridge and extend west to the Flat Run Rd. and then north to the Buford and E. Danville pike.

Massillon, O.—The establishment of a new city street running west from 2034 South Erie St. to meet the east abutment of the contemplated viaduct to be built across the canal, river and railroads, by the Co. Comrs., has been authorized by the Council.

Newark, O.—A resolution has been passed declaring it necessary to improve Andover St., from Cedar St. to Penney Ave., by paving and curbing the roadway thereof.

Springfield, O.—A resolution has been passed declaring it necessary to improve the roadway of Pleasant St., from Yellow Springs St. to the west line of the Old Dayton Rd., by grading, constructing curb and gutter and paving with vitrified brick or block, sheet asphalt, asphalt block or asphaltic concrete.

Stuebenville, O.—A resolution has been passed determining to proceed with the improvement of Superior St., from Seventh St. to Highland Ave., by establishing a grade, grading and constructing a fire brick pavement with the necessary curbs, and a cement sidewalk on the south side.

Youngstown, O.—It has been decided that Bryson St. will be repaved with sheet asphalt.

Connellsville, Pa.—The Grand Jury has approved the construction of about 8 miles of modern highways in Bullsikin, S. Union, Georges and Jefferson Twps., at a cost estimated at \$12,000 per mile.

Sioux Falls, S. D.—By action of the City Comn., the preliminary steps have been taken for the paving of the portion of Phillips Ave., between 14th St. and 18th St.

Lookout Mountain, Tenn.—A road bond issue of \$25,000 has been sold to Mayer, Deppe & Walter, of Cincinnati, O., and extensive improvements will be begun at once. R. N. Watkins is Mayor.

Fort Worth, Tex.—The Park Bd. and the City Comn. have agreed to pave Park Ave., at a cost of \$12,000. Address City Clk.

Texarkana, Tex.—A resolution has been passed providing for sidewalks on 12th St., between Grand and County Aves.

Davenport, Wash.—An appropriation of \$36,000 has been made by the Co. Comrs. of Lincoln Co. for the improvement of the Davenport-Harrington Rd., by macadamizing or otherwise hard surfacing.

Beaver Dam, Wis.—The Council will issue \$25,000 to pay for the city's share of paving to be laid the coming summer. Address City Clk.

Bids Received and Contracts Awarded.

Pasadena, Cal.—J. E. Haddock was awarded the contract for the improvement of Walnut St., at \$7,080.

Los Angeles, Cal.—J. M. Montgomery, of Alhambra, was the lowest bidder for improving Ave. 64 from Pasadena Ave. to the north city limits, at 17½c. per sq. ft. for asphalt paving, 30c. per sq. ft. for vitrified block gutter, 10c. per sq. ft. for granite block gutter, and 1,050 for storm drains and appurtenances.

The following bids were received by the Bd. of Pub. Works for the improvement of Sunset Blvd and other streets: Fairchild-Gilmore-Wilton Co., 22 7-10c. per sq. ft. for asphalt paving; 14c. per sq. ft. for macadam, grading and repaving and oiling; \$2.70 per lin. ft. for regrading, regravelling and reolling in Normandie Ave.; \$2.75 per lin. ft. for grading, graveling and oiling in Edgemont St.; \$1.30 per lin. ft. for grading, graveling and oiling in Vermont Ave.; 35c. per lin. ft. for cement curb; 16c. per sq. ft. for concrete gutters; 32c. per sq. ft. for vitrified block gutter; 43c. per sq. ft. for granite block gutter; 12½c. per sq. ft. for sidewalk, and \$5,705 for culverts and storm drains. The Barber Asphalt Paving Co.—21 6-10c. per sq. ft. for asphalt paving; 15 8-10c. per sq. ft. for macadam repaving; \$1 per lin. ft. for grading, graveling and oiling in Vermont Ave.; \$3 per lin. ft. for grading, graveling and oiling in Edgemont St.; \$3 per lin. ft. for regrading, regravelling and reolling in Normandie Ave.; 35c. per lin. ft. for cement curb; 12c. per sq. ft. for cement sidewalk; 33 6-10c. per sq. ft. for vitrified block gutters; 48 6-10c. per sq. ft. for granite block gutters; 20 7-10c. per sq. ft. for cement gutters, and \$6,015 for culverts.

J. M. Montgomery, of Alhambra, was the lowest bidder at \$25,635.50 for improving approximately 6.23 miles of the Telegraph-Laguna and South Pasadena Rd. The estimated quantities are as follows: 8,200 cu. yds. of excavating, 32,740 lin. ft. of shaping road bed, 23,100 tons of oiled macadam, 151.6 cu. yds. of class A concrete, 7,926 lbs. of steel rods, 36 lin. ft. of 30-in. reinforced concrete pipe, 246 lin. ft. of 24-in. corrugated pipe, 600 lin. ft. of standard guard fence.

The Fairchild-Gilmore-Wilton Co. has been awarded the contract for the improvement of Fremont Ave. at 17½c. per sq. ft. for asphalt paving, 17½c. per sq. ft. for repaving, 35c. per lin. ft. for cement curb, 30c. per sq. ft. for vitrified block gutter, 40c. per sq. ft. for granite block gutter, 12c. per sq. ft. for cement sidewalk, \$700 for storm drain. Aggregate amount, \$21,487.45.

The Fairchild-Gilmore-Wilton Co. was awarded the contract for the improvement of Santa Monica Blvd. at 19 9-10c. per sq. ft. for asphalt paving, 35c. per lin. ft. for cement curb, 32c. per sq. ft. for vitrified block gutter, 12½c. per sq. ft. for cement sidewalk, \$2,450 for culverts. Aggregate amount, \$22,188.10.

Columbus, Mo.—The City Council has awarded to the F. B. Bewick Construction Co. a contract at \$10,798.95 for the paving of William and Hockaday Sts.

St. Joseph, Mo.—The Metropolitan Paving Co. has been awarded a contract by the Bd. of Pub. Works for paving Lover's Lane, from Sixth Ave. to 22nd St., with mineral rubber. The bid was \$1.85 per sq. yd.

Roselle Park, N. J.—A contract for the construction of 15,968 sq. yds. of Dolarway paving has been awarded to Bamberger & Chapman, of Orange, N. J.

Cincinnati, O.—A contract for the paving with bituminous macadam of W. 8th Ave., between the old and the new St. Joseph's Cemetery, has been awarded to Ed. Ryan at \$60,115.14.

Premont, O.—The City Bd. of Control has awarded to Ziesler & Remond a contract, at \$14,321, for the paving of Buckland Ave.

Dallas, Tex.—The City Comm. has awarded the contract for paving Carroll Ave. with Bermudez asphalt concrete to the Roach-Manigan Co., at a cost of \$1.97 per sq. yd., the total amount involved being \$17,554.

Contract has been awarded for paving Germania St., from Swiss to Ross Aves., with bitulithic, to the Texas Bitulithic Co. The cost will be about \$14,000.

Houston, Tex.—The City Council has awarded to the Texas Bitulithic Co. a contract for paving with bitulithic McGowan Ave., between Milan and Albany Sts. at a price of \$2.43 per sq. yd.

Seattle, Wash.—Contracts were award-

ed for paving the alley in block 41, Capitol Hill addition, division six, to Will Koptl, whose bid was \$2,298, and for the grading, plankling and construction of wooden sidewalks in Terry Ave. N. and connecting streets, to Henry Price, whose bid was \$10,364.

Wenatche, Wash.—The following bids have been received for the paving of the business district, comprising 36,232½ sq. yds.: J. J. McNeerney, of Wenatche, \$110,-140.87 for creosoted wood blocks; Barber Asphalt Co., bitulithic, \$92,822.98; Spokane Asphalt Co., of Spokane, brick, \$117,816.12.

BRIDGES.**Bids Asked and Prospective Work.**

Birmingham, Ala.—Bids will soon be asked for the construction of a bridge over the railroad tracks in North Birmingham. Address Chmn. of the Bd. of Roads and Revenue of Jefferson Co.

Yuma, Ariz.—The Reclamation Service has recommended the construction of a concrete bridge, 18 ft. wide, over the Colorado River near Yuma. Estimated cost, \$75,000.

St. Augustine, Fla.—Bids will soon be asked for the construction of a concrete bridge over Oyster Creek. Address Chmn. of the Bd. of Co. Comrs. of St. John Co.

Macon, Ga.—The City Council will give \$4,000, City Water Board \$3,000, and Bibb Co. \$6,000 for strengthening the Spring St. bridge so that it can support main providing North Highlands with water service. Address John T. Moore, Mayor.

Baltic, Conn.—A \$3,800 bridge will be constructed over the canal. Address Arthur P. Coke, Town Clk.

Dixon, Ill.—The First Ave. bridge at Sterling has been condemned by the State Highway Comm., following an investigation by Engineer Bilger of the Comm.

Peoria, Ill.—At a recent conference between the Bridge Comm. of the City Council and Engineer Hedrick, of the Kansas City firm of Hedrick & Cochran, a satisfactory settlement of the difficulty in reference to the Bridge St. viaduct plans was reached.

Rockford, Ill.—Petitions are being circulated asking the Council for an appropriation to build a bridge across Rock River at Morgan St.

Council Grove, Kans.—Bids will be received by the Bd. of Co. Comrs. of Morris Co. until Jan. 8 for constructing a bridge over the Niocho River. Cost, \$12,000. Address A. E. Smith, Chief Engr.

Holton, Kans.—Bids will be received Dec. 27 for material and for construction of Bridge No. 1, between sections 20 and 29, 110-ft. span; Bridge No. 2, 90-ft. span; Bridge No. 3, 59-ft. span; Bridge No. 4, 59-ft. span; Bridge No. 5, 80-ft. span. Address W. H. Webster, Jackson Co. Clk.

Albany, Mo.—By a recent order of the Gentry Co. Court a new bridge will be constructed over the Gale ford, southwest of Albany.

Kansas City, Kan.—Plans for a high line bridge over the Kaw River on the site of the present East Kansas Ave. bridge in Kansas City, Kans., were adopted by the Wyandotte Co. Comrs. The bridge with its approaches will constitute the Kansas part of the 23rd St. viaduct which Kansas City, Mo., proposes to build to connect the new Union Depot with the Armourdale Mfg. Co. It will cost \$450,000, and will be of reinforced concrete.

Omaha, Neb.—Sealed bids for the construction of steel and wooden bridges that may be built in the county of York for the year 1913 will be received at the office of the Co. Clk. on or before noon, Jan. 14, 1913.

Lysander, N. Y.—Bids will be received Dec. 27 for building the super-structure of six spans of a reinforced concrete bridge across the Oswego River at Phoenix, N. Y. Work includes removal of old bridge and construction of temporary bridge. Address B. A. Barnard, Town Supt.

North Tonawanda, N. Y.—Plans are being made to build a bridge over the canal. Address W. M. Mills, Pres. of the Bd. of Trade.

Ashtab (Mifflin), O.—Eighty thousand in bonds have been voted to build the Agtes bridge in Mifflin Township. Address Tracy Brindle, Surv.

Findlay, O.—Co. Surv. Elmer E. Hilly, of Hancock Co., has been instructed by the Co. Comrs. to prepare plans and specifications for the erection of a new bridge over Tiderishi Creek, in Eagle Twp.

Oklahoma City, Okla.—Plans and specifications drawn by the City Engr. for the construction of a bridge across Lightning Creek on A St., in Capitol Hill, were adopted by the City Comrs.

Memphis, Tenn.—The Bd. of City Comrs. has been petitioned for the construction of a viaduct on McLemore Ave., over the Illinois Central Railroad tracks.

Houston, Tex.—City Engr. Dormant has about completed plans for the reinforced viaduct which the Comm. has decided to construct across Buffalo Bayou at the foot of Capitol Ave., and the structure will probably be begun early in January. Mayor Rice has stated that it is his desire to have the contract awarded early during the coming month.

Bids Received and Contracts Awarded.

Augusta, Ga.—The contract for the Archie Butt memorial bridge to be built across the first level canal, at 15th St., has been awarded to the Concrete Engg. Co. of Birmingham, Ala., at about \$25,000.

Peoria, Ill.—The Bd. of Supvrs. has awarded a contract to the Schmitt Construction Co. for the construction of a bridge across Dry Run Creek near Bradley Park, at \$1,975; and also a contract to the Miller Brothers Construction Co. for a bridge in Richwoods Twp. at \$2,300.

Vincennes, Ind.—The Co. Comrs. of Knox Co. have awarded a contract, at \$2,198, to the Vincennes Bridge Co. for the construction of a bridge across Kelson Creek at 6th St.

Kansas City, Mo.—The sum of \$52,948 is to be paid to the Midland Bridge Co. for widening the Main St. viaduct over the tracks of the Kansas City Terminal Railway Co., the contract having recently been let by the Bd. of Pub Works.

Lisbon, O.—The Comrs. have let the contract to Theodore Bretz for building a concrete abutment at bridge 440, the contract price being \$464.90.

BONDS.

Apalachicola, Fla.—Bids will be received Dec. 31 by the Bd. of Comrs. of Franklin Co. for the purchase of \$20,000 4½% county road improvement bonds. Address R. M. Yent, Chmn. of the Bd.

Hastings, Fla.—An election will be held in February to vote on the expenditure of \$10,000 for paving, etc.

St. Petersburg, Fla.—The Bd. of Co. Comrs. of Pinellas Co. has authorized an election for a \$370,000 road bond issue.

Boise, Ida.—The Council has authorized a bond issue of \$5,528 for grading, paving and curbing. Interest 7%. Address City Clk.

Stewardson, Ill.—An election will be held to decide the question of issuing bonds for street purposes. Address City Clerk.

Cadiz Ky.—On Jan. 25 an election will be held to decide on a bond issue of \$150,000 for pikes. Address City Clk.

Troy, Ky.—A bond issue of \$73,000 for building stone roads has been voted.

Biloxi, Miss.—The Council is planning to issue \$50,000 impvt. bonds. Address City Clk.

Hattiesburg, Miss.—Beats 1 and 3 of Forrest Co. have voted to issue \$100,000 bonds for good roads.

Liberty, Miss.—The Bd. of Supvrs. of Amite Co. will sell \$40,000 county road bonds. Address Co. Clk.

Meridian, Miss.—The Bd. of Supvrs. of Lauderdale Co. has placed an order on its minutes declaring its determination to make an additional bond issue of \$100,000 for roadwork in District No. 1. Address Co. Clk.

Natchez, Miss.—Adams Co. has issued bonds in the amount of \$150,000 for road construction.

Raleigh, Miss.—The Smith Co. Bd. of Supvrs. has sold \$45,000 of paving bonds to S. L. McLaurin, of Brandon, Miss.

Chinook, Mont.—Forty thousand dollars in bonds has been voted for road purposes. Address City Clk.

Little Falls, N. Y.—One hundred and thirty thousand dollars in bonds has been voted for the construction of roads. Address City Clk.

Youngstown, O.—Street improvement bonds to the amount of \$113,490 will be offered for sale in January.

Corvallis, Ore.—The Council is planning to issue \$2,500 in bonds to pay for bridge now being constructed. Address City Clerk.

Portland, Ore.—Taxpayers have organized to advocate a bond issue of \$2,000,000 for parks, playgrounds and boulevards.

Mauch Chunk, Pa.—The Comrs. of Carbon Co. are stated to have decided to issue \$50,000 bonds for the construction of a bridge over the Lehigh River to connect Mauch Chunk and E. Mauch Chunk.

Reading, Pa.—An ordinance has passed the Council providing for an issue of \$100,000 paving bonds. Address T. S. Ramsey, City Clk.

Ashland City, Tenn.—A bond issue of \$100,000 for the improvement of Cheat-ham Co.'s roads was carried at an election held Dec. 7.

Alvin, Tex.—The precinct of Brazoria Co. has issued bonds to the amount of \$150,000 for the building of good roads.

Athens, Tex.—The Co. Comrs. of Henderson Co. have been requested to order a road bond election for Athens Twp.

Austin, Tex.—Road improvement bonds to the amount of \$300,000 for Wharton Co. have been approved by the Atty. Gen.'s Dept.

Austin, Tex.—The Atty. General's Dept. has approved a bond issue of \$28,000 for paving Marshall St., Austin.

Conroe, Tex.—On Dec. 23d an election will be held on the question of issuing \$250,000 road bonds. Address City Clk.

El Paso, Tex.—On Dec. 27 a vote will be taken on a \$390,000 bond issue for constructing and repairing county roads.

Falfurrias, Tex.—The Comrs. Court of Brooks Co. has called an election to be held Dec. 21 to vote on the proposition of issuing \$45,000 in bonds for road improvements.

Greenville, Tex.—At an election of taxpayers held Dec. 9 the proposition of issuing \$75,000 in bonds for street paving purposes was carried. Each property-owner on the streets to be paved will pay one-third of the cost of paving, and this means that a total of \$225,000 will be spent for the work.

Hallettsville, Tex.—The Co. Comrs. have ordered that a \$100,000 road improvement bond issue be voted on in Yoakum Precinct.

Lockhart, Tex.—The Comrs. Court of Caldwell Co. has ordered an election to be held in Precinct No. 3 on Dec. 23 to vote on the proposition of issuing \$40,000 in bonds for the construction of roads.

Palacios, Tex.—The voters of Dist. No. 1 of Matagorda Co. have voted to issue \$100,000 in bonds for road improvements.

Port Lavaca, Tex.—The Co. Comrs. of Calhoun Co. have ordered a road bond election for \$135,000 to take place Dec. 31, the bonds to be used for the improvement of 36 miles of main road near Port Lavaca.

Temple, Tex.—The Council favors the issue of \$75,000 sewer bonds and \$75,000 paving bonds. Address J. B. Watters, Mayor.

Waco, Tex.—The Council is planning to issue paving and city hall bonds. Address Mayor.

MISCELLANEOUS.

Waycross, Ga.—The contract for furnishing the city with 6,000 sq. yds. of asphalt blocks for paving a part of Albany Ave. has been awarded to the Hastings Paving Co. of New York City.

New York, N. Y.—Sealed bids will be received by Maurice E. Conolly, Pres. of the Boro. of Queens, in his office in Boro. Hall, Long Island City, until 11 a. m., Dec. 24, for furnishing and delivering to the Bureau of Highways three 10-ton gross steam road rollers.

Ashland City, Tenn.—One hundred thousand dollars in bonds has been voted for road improvements. Address Co. Judge.

Antigo, Wis.—Langlade Co. will raise \$13,512 for the building of roads and \$5,000 for buying road machinery. Address Malcomb Hutchinson, Co. Surv.

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Proposed Highway Measure in Texas

State Senator H. B. Terrell, who was the author of a bill which he introduced at the last session of the legislature providing for the creation of a state highway commission for Texas but which measure failed of enactment because of the lack of time to get it through, has prepared another bill on the same subject. He states he will introduce it at the beginning of the coming session of the legislature, which meets January 9, and that he is confident that it will meet with favorable consideration. The new measure is practically the same as that which he offered two years ago. It has met with the official endorsement of many of the automobile clubs in the state as well as of the directors of the Texas Good Roads Association.

In substance the bill provides for the appointment of a state highway commission to consist of five members who shall serve without pay other than allowance of their actual necessary traveling expenses. The commission shall appoint a state highway engineer who shall receive a salary not to exceed \$4,000 per annum in addition to his traveling and other expenses. The state highway engineer is authorized to select his own assistant engineers and other necessary force of employees. The regular meetings of the state highway commission shall be held quarterly in March, June, September and December of each year. Special meetings may be called by the chairman or by the commission. The actual affairs of the office shall be looked after by the state highway engineer. He shall keep on file copies of all plans, specifications and estimates prepared by his office. He shall cause to be made and kept by the state highway department a general highway plan of the state; shall collect information and compile statistics relative to the mileage, character and conditions of the highways in the different counties of the state; he shall investigate and determine the methods of road construction best adapted to the various sections of the state and shall establish standards for the construction and maintenance of highways, culverts and bridges in the various counties, giving due regard to the topography, natural conditions and the character and availability of road building material in such counties. He may at all reasonable times be consulted by county or city officials, having authority over highways, relative to any question involving highways, and he may in like manner call on such county or city officials for any information or assistance they may render in the performance of his duties with reference to the highways within their counties or cities, and it shall be the duty of said county or city officials to supply same to the state highway engineer. He shall approve the general plans and specifications of all road construction from the proceeds of the sale of bonds by a county or by any subdivision of a county, and the county commissioners' court of any such county is expressly forbidden to expend any part of said money for actual construction until said state highway engineer has given his approval. He shall submit to the state highway commission a quarterly report and an annual report containing such information as the rules of said commission may require. He shall also submit to

said commission a complete biennial report covering all the work of the state highway department, which report shall be transmitted by the state highway commission to the governor and to the legislature, together with the recommendations of said commission.

Various other duties of the state highway engineer are prescribed in the measure.

The bill provides for supervision of motor car registration by the state highway department. The license fees are designated as \$2 for each motor-cycle and \$5 for all other motor vehicles. It also provides that the funds obtained from registration fees shall be deposited with the State Treasurer and called the state highway fund. This fund shall be used for the support of the state highway department and for carrying on the work of the department as provided for in sections 1 and 15 of the act. The disposition of the fund is to be under the supervision of the Governor of the state and the State Treasurer. Any unexpended balance of the state highway fund on hand on February 1 of each year, may, at the discretion of the highway commissioner be turned over into the general revenues of the state to be held for future work of the state highway department.

Washington State Good Roads Convention

A good roads convention attended by delegates from all sections of the state of Washington was held at Tacoma, December 4 and 5. A resolution was adopted at this meeting favorable to the building of a demonstration road between the city limits of Olympia and Tumwater. According to the plans a number of paving concerns all over the country are to be allowed to lay down sample sections of road. The Olympia Chamber of Commerce was instrumental in bringing about the adoption of this resolution. The proposed road will be a section of the Pacific highway and each paving company will be allowed to lay down a strip 200 ft. long.

A resolution was also adopted endorsing the Pacific highway, and another was passed specifying that the legislature be asked to provide for necessary roads to connect the east side of the Cascade Range with the west side. The latter resolution, by putting the question up to the legislature, settled a long and earnestly contested dispute as to whether the proposed road along the Cascade Range should go by way of the Snoqualmie Pass or the Columbia river route.

Another resolution was adopted providing for a recommendation that state road money be spent in a given locality in proportion to the taxes paid in such locality. A resolution was also adopted recommending that the legislature be asked to provide for a three mill tax levy for the permanent highway fund instead of a one mill levy, and recommendation will be made for a one mill levy for state highway fund instead of one half mill as at present.

Other actions taken by the delegates were as follows: Urging the passage of a law fixing methods of taxation for road improvement on abutting property owners; the setting aside of all returns of the levy under the permanent highway law to the credit of counties as a maintenance fund; urging that state roads be started from recognized

trade centers; endorsing the survey and construction of a trails system to Mt. Tacoma and widening, macadamizing and safeguarding the present road; the survey and extension of the south side road; the construction of a road into Indian Henry's.

The Convention went on record as favoring the drafting of a bill relating to the improvement of arterial streets and highways, and providing for the assessment of property specially benefited; favoring a law permitting county commissioners upon petition of 15 per cent of the electors to submit to a vote of the people propositions of bond issues for county roads without waiting for special elections, and requesting congress to provide roads inside of state forest reservations as may be requested by the state highway department. It was also advocated that the grades of all trunk lines be fixed so as not to exceed 5 per cent and all laterals not to exceed 8 per cent. The State Board of Education will be requested to provide brief instruction in road work in public schools.

John P. Hartman of Seattle was elected President of the association succeeding S. A. Perkins of Tacoma and it was decided that the next meeting of the association be held at North Yakima.

New Highway Organization in Texas

At a meeting attended by representatives of nearly every county between San Antonio and Houston, Texas, held at Victoria, November 20, the Alamo-Victoria-San Jacinto Highway Association was formed. The purpose of this organization is to promote the construction of a road across Texas running from Alamo to San Jacinto, via Victoria. J. P. Pool, County Judge of Victoria county, was elected President of the association and D. E. Colp of San Antonio, Secretary. The following vice-presidents, one for each county were elected: Bexar County, T. N. Smith of San Antonio; Guadalupe, C. F. Blumberg of Sequin; Gonzales, Bob Walker of Gonzales; De Witt, Walter Beiffert of Cuero; Victoria, A. N. McFadden of Victoria; Jackson, A. E. Westhoff of Edna; Wharton, J. F. Walker of Wharton; Fort Bend, Sid Winston of Richmond; Harris, J. F. Culliner of Houston.

County associations will be organized in each of the several counties and the vice presidents of each county will act as president of the county association. The officers of the association will form the executive committee.

The organization work of the territory between San Antonio and Victoria will be in charge of the San Antonio Chamber of Commerce, while that of the route between Victoria and Houston will be in charge of the Houston Chamber of Commerce.

When completed this highway will be the longest uniform macadam road in the state. Preparations are being made by the association to have elections held in each county through which this highway is to pass to vote upon issues for the construction of the road. It is expected that these elections will be called in the different counties within the next 90 days.

Road Building Course in Kentucky University

Walter E. Raur, Dean of the College of Civil Engineering of the State University of Kentucky, has announced that the second annual course for municipal and highway engineers will open January 6.

This course will be open to all citizens of the state of Kentucky free of charge, and prospective students will be admitted without reference to educational qualifications. The subjects of surveying, leveling, mapping, the making of profiles, road construction and maintenance, city street paving and highway bridges will be studied and discussed. Experts on the various subjects under consideration will lecture to the classes from time to time.

New Street Project in Los Angeles, Cal.

Plans and estimates for new civic operations involving the construction of several new streets and the expenditure of millions of dollars have been prepared by engineers commissioned by the Bunker Hill Razing and Regrading Association of Los Angeles, Cal. The proposed improvement includes the removing of portions of all the hills lying between Hill St. on the south, Sunset Boulevard on the north, Main St. on the east and Figueroa and Fremont Aves. on the west. The report of the engineers has been presented to the Streets and Boulevard Committee of the Los Angeles City Council. It was prepared by W. E. Barrett, engineer for the Midway Gas Co., and H. M. Dougherty, member of the engineering firm of J. C. White & Co. of New York city.

The problem of improving this section has resolved itself to two propositions. One involves the boring of tunnels under this district, the other, the razing and reggrading of the territory. The engineers have estimated that the entire hilly portion may be reduced to a grade approximating that of the business section of the city, at a cost of something over thirteen million dollars. To offset a portion of this would be returns of about five million dollars from the enhancement in value of the dumping ground where earth would be deposited after it was removed.

Five different methods of improving the territory are outlined in the report as follows:—

1. Leveling the hills bounded on the south by Fifth St., on the east by Hill St., on the north by Temple and the west by Figueroa and Fremont Aves. This project calls for the excavating of 13,787,205 cu. yds. at an estimated cost of \$9,225,499.

2. Leveling Normal School Hill only, requiring the removal of 300,000 cu. yds. at an estimated cost of \$120,000.

3. Leveling the hills bounded by Temple St. on the south, Broadway on the east, Sunset Boulevard on the north, and Figueroa Ave. on the west, requiring the removal of 16,990,000 cu. yds. at an estimated cost of \$10,963,594.

4. Leveling the high ground between Temple St. on the south, Main St. on the east, Sunset Boulevard on the north and Broadway on the west, requiring the removal of 1,000,000 cu. yds. at an estimated cost of \$1,178,050.

5. Embracing all the work of the preceding four divisions, and also including the reggrading as taken under the separate project of the Normal School site and the Bunker Hill project; the area between Templ St. and Sunset Boulevard, and Ft. Hill; establishing grades on the north and south boundary streets between Fifth and Sunset Boulevard, with a maximum of 1.54 per cent with the exception of one block on Broadway between First and Temple St., where a maximum of 2.26 per cent will be reached. The maximum grades on east and west streets to be 2.08 per cent with the exception of Sunset Boulevard on which a 3 per cent grade will be reached between Broadway and Bunker Hill Ave. This project is itemized as follows: Excavation, 20,859,600 yds., \$6,084,057; purchase of dump, \$1,000,000; street work, \$643,497; sewer and mains, \$96,790; bridges, cost not estimated; maintenance of traffic, \$60,000 and other items including engineering plans and supervision and interest during the construction, bringing the entire cost up to \$13,226,801.

It is the belief of the engineers that any one or all of these projects are practicable and that the work could be accomplished within two years. It is also their belief that proposition 1, 2 and 4 could be combined with fairly good results.

The general opinion of the engineers is that the accomplishment of any one proposition would be productive of no more than temporary benefit.

GOOD ROADS

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Questions by the Illinois Legislative Committee

The committee appointed by the Illinois state legislature at the last general assembly for the purpose of revising county and township road and bridge laws of the state, recently held a meeting at Springfield. There was prepared at that meeting a list of questions for distribution among the farmers and other taxpayers in the state who are interested in the question of highway improvement. The answers to these questions were made returnable December 20. The questions follow:

Do you favor the continuation of the present system of road management in your county? What changes would you suggest?

Do you favor the construction of permanent roads in your county with state aid?

Do you favor the creation of a state highway commission to have general supervision over the highways and the selection of a county road superintendent to cooperate with the state highway commission?

Do the farmers in your county favor a change in the law providing for the improvement of highways in accordance with modern demands? And do you think the majority of the farmers of your county would agree with your answers to the above questions?

Third Annual Convention of the Iowa Good Roads Association

At the Third Annual Convention of the Iowa Good Roads Association held at Des Moines, December 17 and 18, every county in the state was represented by delegates. Lafayette Young, Editor of the Des Moines Capital and President of the Iowa Good Roads Association, presided over the convention.

The leading feature of the convention was the adoption of resolutions calling for a definite legislative program looking towards the construction of permanent roads throughout the state, other policies favored in the resolutions was a provision for the enactment for a state-wide vote on a proposition to issue bonds for the building of permanent roads and a clause providing for the levying of a 1 mill tax which it is estimated will raise an annual sum of \$1,750,000. This added to the automobile tax

will create a fund of two and one-quarter million dollars annually during the two years. In additions to these resolutions one was adopted favoring a permanent highway commission and also one favoring a compulsory road drag law. A committee of fifteen men representing the various sections of the state were appointed to draw up these resolutions, and they were adopted unanimously. President Young was authorized to name a legislative committee to frame the text of the proposed legislation and present it at the coming session of the legislature.

It was further resolved by the delegates that the present road drag laws should be simplified; that rural highways should be classified; that the road laws of the state should be codified, and that county engineers should be appointed subject to the approval of the state highway commission.

According to statistics recently issued by the State Highway Association of Minnesota, Iowa stands well towards the bottom in the list of states in the matter of road improvement, having 102,448 miles of road, of which only 1,664 are improved by macadam or other hard surface material.

Convicts on New Jersey Roads

Convict labor in the construction of roads in New Jersey was employed for the first time December 13. Sixteen convicts from the state prison in Trenton started work on that date on the White House Road between Trenton and Allentown, Pa. A foreman from the State Highway Department accompanied the prisoners, who were in charge of three deputy wardens of the prison. The sixteen men were chosen from the 1,200 inmates of the institution, selections being made both on account of the physical qualities of the men and their temperaments. In most cases they were long term prisoners who had served the greater part of their time, so that the probability of their making attempts to escape was reduced to a minimum. They seemed to be glad of the opportunity to get away from the confinement of the prison walls, and while they were unaccustomed to the hard work they suffered no great inconvenience. About 700 feet of road bed was prepared the first day.

Governor O. B. Colquitt of Texas has officially stated that the following highways in Texas are feasible either for federal instruction or federal maintenance: From Galveston to Houston, thence to Navasota, Bryan, Franklin and Marlin to Waco; at Waco dividing into three branches, one extending through Hillsboro and Waxahachie to Dallas and on through McKinney, Sherman and Denison to Red River; another through Corsicana, Kaufman, Greenville, Cooper and Paris to Red River, and the third through Cleburne, Fort Worth and Denton to Gainesville. Other roads suggested are one from San Antonio to Corpus Christi, another from San Antonio through Austin to Waco, and one from Houston through Richmond, Columbus and La Grange to Austin, passing through the state's penitentiary farms.

It is announced that the commissioners courts of 33 counties of Texas have under consideration the matter of ordering elections to vote on issuing bonds for the improvement of roads. The total amount of these proposed issues is \$3,210,000. During the month of November three good roads bond elections were held and \$250,000 of bonds were voted. Of this amount Magruder County voted \$150,000 and Matagorda \$100,000.

Coming Meetings

Jan. 21-23.—American Wood Preservers' Association.—Annual Convention, Chicago, Ill. Secy., F. J. Angier, B. & O. R. R., Baltimore, Md.

Personal Notes

Irving L. Rider has been appointed City Engineer of San Jose, Cal.

C. R. Brawner of Los Angeles Cal., has been appointed City Engineer of Eagle Rock, Cal.

Charles A. Allen, City Engineer of Worcester, Mass., for 15 years subsequent to his appointment in 1880, died at his home in Worcester, Dec. 9.

S. C. Chamberlain of San Fernando, has been appointed City Engineer of that city, succeeding Harry E. Waite who recently resigned.

H. A. Paine, Road Engineer of Carolina Co., Md., has notified the county commissioners of his intended resignation to become effective March 1.

Maj. E. M. Markham, Corps of Engineers, U. S. A., who has served as Consulting Engineer for the city of Jacksonville, Fla., for several months, has resigned.

Gerhardt Morgner, county Road Engineer of Pulaski County, Ark., died in a hospital at Little Rock Dec. 16 as the result of injuries sustained in a collision with a motorcycle.

A. C. Janni, formerly Bridge Engineer, Board of Public Improvements of the city of St. Louis, Mo., has opened an office in that city and will engage in private practice.

James H. Sturdevant, who has been a division engineer in the state department of highways of New York with headquarters at Watertown, has been appointed first deputy in the department, succeeding Charles F. Foley, who recently resigned.

A lecture was delivered before the graduate students in Highway Engineering at Columbia University, Dec. 20 on "The Mining and Refining of Asphaltic Oils" by Francis P. Smith, M. Am. Soc. C. E., chemical and paving engineer of New York City.

Gail L. Barnard and Raymond Chase, former engineers of Duval County, Fla., have resigned and have opened a contracting office at 336 St. James Building, Jacksonville, under the style of The Engineering & Constructing Co.

D. E. McComb, former Superintendent of Sewers of the District of Columbia has been appointed Engineer of Bridges of the District, succeeding T. C. J. Bailey who died recently. Mr. McComb's appointment will go into effect immediately upon the completion

of a report which he is preparing on the need and cost of a municipal asphalt plant for the District. The report will be submitted to Congress.

Thomas Fellows, for some time an engineer connected with the California State Highway Department in the southern part of the state has resigned, and has become associated with the Western Architectural and Building Co. as Superintendent of Construction.

J. C. Travilla, Street Commissioner of St. Louis, Mo., has announced his intention of resigning within a short time. He will take charge of the \$1,000,000 road project of Tarrant Co., Texas. It is estimated that the work will require two years to complete and during that time Mr. Travilla will have headquarters in Fort Worth, but will continue to make his home in St. Louis.

General Notes

The town of Southampton, L. I., will expend \$66,869.34 on its highways during the coming year.

The Rochester Automobile show will be held in three buildings at Exposition Park, Rochester, N. Y., from January 27 to February 1.

The city of Hampton, Ia., will build 35 blocks of pavement next year. It is expected that a large percentage of this work will be of brick.

During the last twelve months seven and one-half miles of concrete sidewalks have been laid in Terrell, Tex. A \$60,000 paving contract will be begun January 1, 1913.

The Albany Automobile show will be held in the State Armory, Albany, N. Y., February 15-22. C. A. Simmons is Manager with headquarters at the Buick Motor Co., 95 Washington Ave., Albany.

At the instigation of A. B. Carson, City Engineer of Bryan, Tex., a movement has been started towards paving the streets on the cooperative plan, the city to pay one-third of the cost and the property owners on each side of the street to pay one-third.

The Public Service Commission of the Second District of New York state, in its estimate filed with the State Comptroller for proposed appropriations for 1913 asked for an appropriation of \$500,000 for the elimination of grade crossings throughout the district.

The Central City Improvement Association, of Syracuse, N. Y., has recommended that a new bridge be constructed across the canal at West Genesee street; also that the present structure be widened and its approaches regraded.

At a recent special town meeting held in Athol, Mass., it was voted to spend the sum of \$48,000 for the construction of a road between the South Main St. bridge and the Athol Fair grounds. This will make a total of \$65,000 to be spent during the coming year on the roads of the town.

President R. H. Higgins of the Colorado Good Roads Association and E. E. Sommers, special representative of the Denver Motor Club have been selected as a committee to take steps towards securing the passage of a bill for the appropriation of the \$750,000 now lying idle in the state treasury for good roads purposes.

At the recent election held in Oregon several road measures were voted upon. The county road bond issue and the bill creating a State Highway Department were lost, while a bill providing for working convicts on public roads and one limiting the indebtedness of counties for road construction to two per cent. of the assessed valuation were carried.

The building of two hundred miles of roads in Hancock County, O., representing 80 petitions was brought to a sudden stop December 19 by the statement of Judge Michael Donnelly, relative to a road case which was being argued, that the old Garrett road law had been repealed in 1910. Judge Donnelly stated that because the decision of the Supreme Court was not published the fact that the law was a dead issue was not generally known.

"Elastite" is the name of a new elastic paving joint for brick, wood block, and concrete pavements, curbs and side-walks, made by the Philip Carey Co. of Cincinnati O. It is made from wool felt saturated, coated and bonded with a waterproof asphalt compound. The material is put in while the street is being laid and is designed to take the place of wood strips. It is claimed by the manufacturers that Elastite does away with the expense of placing the wood strips and removing them, as well as the expense and trouble of filling the joints with pitch. The Elastite is not removed but is left in place. It is made in any size desired from 3 in. to 12 ins. in length and from 1/4 in. to 2 ins. in thickness.

CONTRACT NEWS

CONTRACTS PENDING

Roads and Streets

Date of letting	Reported in issue of
12-30 Houston, Tex., grad., pav., etc.	12-28
12-31 Centerville, Md., rd. imp.	12-28
12-31 Marshall, Tex., paving	12-28
1-3 Steubenville, O., rd. imp.	12-28
1-4 Cleveland, O., rd. work	12-14
1-4 Burbank, Cal., st. work	12-28
1-6 Franklin, Ind., rd. imp.	12-28
1-6 Brownstone, Ind., rd. imp.	12-28
1-6 Kusselsaer, Ind., mac. rd.	12-28
1-6 Shelby, Ind., paving	12-28
1-6 Salem, Ind., rd. work	12-28
1-6 Lebanon, Ind., rd. work	12-28
1-6 Grove Hill, Ala., state aid rd. work	12-28
1-7 Hillsboro, Tex., sidewalks	12-28
1-7 Vincennes, Ind., 2 roads	12-28
1-7 Logansport, Ind., rd. imp.	12-28
1-7 Corydon, Ind., 2 gravel rds.	12-28
1-7 Marion, Ind., gravel and stone rds.	12-28
1-7 Petersburg, Ind., gravel rd.	12-28
1-7 Crawfordsville, Ind., Co. rds.	12-28
1-8 Manhattan, Kan., rock rd.	12-28
1-8 Lafayette, Ind., gravel rd.	12-28
1-14 Clinton, Ia., st. work	12-28
1-15 Cleveland, O., rd. imp.	12-28
1-15 New York, N. Y., mac. rds., con. sidewalks, etc.	12-28

BRIDGES.

1-2 Tallulah, La., 2 steel bridges	12-14
1-2 Walla Walla, Wash., steel bridge	12-28
1-2 New Brunswick, N. J., 2 con. and steel bridges	12-28
1-4 Washington, D. C., bridge	12-28
1-4 Ocean City, N. J., trestle and bridge	12-28
1-4 Cleveland, O., bridge walk and curb	12-28
1-8 Council Grove, Kan., bridge	12-21
1-8 Albion, Ind., concrete bridge	12-28
1-8 Thief River Falls, Minn., steel bridge	12-28
1-8 Smith, Center, Kan., bridge work for 1913	12-28
1-14 Omaha, Neb., steel and wood bridges for 1913	12-21
1-23 Springfield, O., 2 bridges	12-21
2-1 Yosemite, Cal., 4 bridges	12-14

MISCELLANEOUS.

12-30 Strongsville, O., bonds	12-14
12-31 Apalachicola, Fla., rd. bonds	12-21
1-14 New York, N. Y., bridge material	12-28
1-14 Manila, P. I., bridge material	12-28
1-15 Springfield, O., bridge bonds	12-28

ROADS AND STREETS.

Bids Asked and Prospective Work.

Birmingham, Ala.—City Engr. Kirkpatrick's recommendations to City Comm. for street improvement for the year 1913 include asphalt, bitulithic, wood block, brick asphaltic concrete, bitulithic concrete, concrete and granite block. The streets which will be paved are 23rd St. between First and Eighth Aves., 24th St. between Eighth and Twelfth Aves.; 25th St. between First and Eighth Aves.; 22nd St. between First and Eighth Aves.; First Ave. between 38th and 85th Ssts., and Eighth Ave. between 13th and 17th Ssts.

Grove Hill, Ala.—Bids will be received by the Court of Co. Comrs. of Clarke Co. at the Court House, Grove Hill, at 2 p. m., Jan. 6, 1913, for grading, draining and surfacing with sand clay, approximately six miles of state aid road. Profile and specifications are on file with the Probate Judge at Grove Hill. W. S. Keller is State Highway Engr.

Tucson, Ariz.—City Engr. W. H. Thompson has been instructed to prepare plans and specifications for improving Tyndall Ave. from Speedway to Ninth St., and for improving Eighth St. from Fourth Ave. to the east city limits.

Little Rock, Ark.—About 50 miles of road will be built in Pulaski Co. at a cost of \$30,000.

Burbank, Cal.—Bids will be received by the City Clk. until 8 p. m., Jan. 4, for improving 5,500 lin. ft. of Verdugo Ave. between Front and Tenth Sts.; the work consists of grading, oiling and tamping the 43-ft. roadway, constructing cement curbs, 5-ft. cement sidewalks and the construction of culverts. F. E. Craig is City Clerk.

Fresno, Cal.—Bids will be received at once for the construction of cement curbs and sidewalks on several streets in Biola, a suburb of Fresno. The estimated cost of the improvement is \$60,000.

Imperial, Cal.—The Trustees have

passed resolutions of intention to order the construction of 15 miles of cement sidewalks.

Los Angeles, Cal.—The City Engr. has recommended to the Bd. of Pub. Works that an 8-ft. cement walk be constructed along each side of Sunset Blvd., between Main St. and Marion Ave., with the following exceptions: That a 13½-ft. walk be constructed on each side of the boulevard from Main to New Hight Sts. and that from Centennial to Beaudry Sts. the walks be six feet in width. This improvement is to be carried on in connection with the proceedings to change the grade between Hill and Marion Aves.

Long Beach, Cal.—The City Council will order the construction of curbs and sidewalks on 23rd from Olive to California Ave., on Olive Ave. between 21st and 23rd Sts. on Hill St. between American and California Aves., on Myrtle Ave. between 21st and 24th Sts., on Lime Ave. between 21st and 23rd Sts. and on California Ave. from Hill St. to the north city limits.

National City, Cal.—A. E. Harstoman of Oakland, together with Wm. Harstoman and W. R. Gulick of Los Angeles, are planning the subdivision of a twenty-acre tract on National Ave. from 16th to 18th Sts. About \$15,000 will be expended on grading and street work. The contract will be awarded to the Knight & Hyde Construction Co. of San Diego.

San Bernardino, Cal.—The City Council has ordered the paving of a portion of Ninth St., about one mile in length, from Arrowhead Ave. to G St.

San Francisco, Cal.—Beale St. is to be repaved from Market St. to the water front in a short time. Paul Fay is to pave from Folsom St. to the front, and the Spvs. will have the new pavement from Market to Folsom Sts. laid at the city's expense.

Property owners have been granted permission by the Pub. Works Comrs. to perform street work under private contracts at the following locations: Grade 18th Ave. between Balboa and Cabrillo Sts.; grade, curb and pave Sadowa St., between Capitol and Plymouth Aves.; curb and pave, in 26th Ave., between California and Clement Sts., at intersection of Corbett Ave. and Corbin Pl., at intersection of Corbett Ave. and Hattie St.; Dolores St., between 14th and 15th Sts.

Denver, Col.—Plans for the paving of Wynkoop St. from Cherry creek to 19th St. with sandstone blocks were approved by the Tramway Co. and the Union Pacific Railroad at a recent meeting with the Bd. of Pub. Works.

Brooksville, Fla.—One and one-half miles of city streets will be paved with brick. Address Chas. M. Price, Mayor.

Bloomington, Ill.—An ordinance has been passed by the City Council, providing for the paving of Clay and Vale Sts. and Mercer Ave., with brick on Portland cement. The estimated quantity is 24,000 sq. yds. E. Folsom is City Engr.

Brownstone, Ind.—Sealed bids will be received by the Co. Comrs. of Jackson until Jan. 6 for the construction of the Elsner Adams and the Ebenezer rds. in Redding Twp. Address H. A. Wacker, Co. Aud.

East St. Louis, Ill.—The Bd. of Loc. Imps. has announced that the work of improving the Rock Rd. from 34th St. to Edgemont will be started in January. The estimated cost is \$320,000.

Kewanee, Ill.—McKinley Ave. will be paved. The material to be used has not yet been decided. Address City Clk.

Peoria, Ill.—Estimates submitted by the City Engr. for the cost of paving Platt St. and Louck's Ave. place the cost of the former at \$25,027 and of the latter at \$16,110.

Waukegan, Ill.—The Bd. of Loc. Imps. Dec. 17 passed resolutions for street paving to the extent of \$93,800. Washington is the principal street under consideration.

A resolution has been passed by the Bd. of Loc. Imps. providing for the paving of Grand Ave. with brick at an estimated cost of approximately \$41,000.

Corydon, Ind.—Sealed bids will be received by the Co. Comrs. of Harrison Co. at Corydon until Jan. 7 for the construction of two gravel roads in Harrison Twp. and one in Blue River Twp. Address E. H. Kimball, Co. Aud.

Crawfordsville, Ind.—Sealed bids will be received by the Co. Comrs. of Montgomery Co. until Jan. 7 for the construction of two county roads. Bennett B. Engle is Co. Aud.

Franklin, Ind.—Sealed bids will be received by the Co. Comrs. of Johnson Co. until Jan. 6 for the construction of the Milford Richardson Rd. Address H. L. Knox, Co. Aud.

Greencastle, Ind.—The Co. Comrs. of Putnam Co. are planning to construct a macadam road in Roachdale Twp. Address Co. Aud.

Lafayette, Ind.—Bids will be received Jan. 8 for the construction of a free gravel road, petitioned for by John Waters, according to the plans and specifications now on file in the office of George W. Baxter, City Aud.

Lebanon, Ind.—Sealed bids will be received by the Bd. of Co. Comrs. of Boone Co. at its office in the Court House, Lebanon, until Jan. 6, for the improvement of certain public highways in the county by grading, draining and graveling in accordance with plans and specifications on file in the office of D. M. Clark, Co. Aud., at Lebanon.

Logansport, Ind.—Sealed bids will be received by the Co. Comrs. of Cass Co. until 10 a. m., Jan. 7, for the construction of two roads in Eel Twp. Address J. E. Wallace, Co. Aud.

Marion, Ind.—Sealed bids will be received by the Co. Comrs. of Grant Co., until Jan. 7 for the construction of gravel and stone roads in Mill, Center and Monroe Twp. Address E. H. Kimball, Co. Aud.

Petersburg, Ind.—Sealed bids will be received by the Co. Comrs. of Pike Co. until Jan. 7 for the construction of gravel roads in Jefferson Twp. Address John D. Gray, Co. Aud.

Rensselaer, Ind.—Sealed bids will be received by the Co. Comrs. of Jasper Co. until Jan. 6 for the construction of a macadam road in Keener Twp. Joseph P. Hammond is Co. Aud.

Salem, Ind.—Bids will be received by the Comrs. of Washington Co. until Jan. 6 for constructing 3,534 ft. of road in Brown Twp. Address Frank Munkelt, Co. Aud.

Shelburn, Ind.—The Town Bd. will receive bids until Jan. 6 for the construction of about 7,000 sq. yds. of paving.

Vincennes, Ind.—Sealed bids will be received by the Co. Comrs. of Knox Co. at Vincennes, until 2 p. m., Jan. 7, for the construction of two roads, one 10,647 ft. long and the other 5,280 ft. long, in Washington Twp. Address John T. Scott, Co. Aud.

Anamosa, Ia.—At a meeting of the City Council a petition signed by several residents on First St. for concrete paving on that street was presented. Address City Clk.

Clinton, Ia.—Sealed proposals will be received by C. J. Reuche, City Clk., until 8 p. m., Jan. 14, for the following street work: Furnishing all tools, labor and material for grading, curbing and guttering with cement concrete combined curb and gutter, draining and paving with vitrified block on a 6-in. base and 1½-in. sand cushion and paving with concrete paving with 6-in. base and 2-in. wearing surface on Second St. The following estimated quantities show the extent of the work: 48,568 sq. yds. of vitrified block, 10,878 lin. ft. of combined curb and gutter, 25,036 sq. yds. of concrete paving. Plans and specifications are on file with the City Clk.

Ft. Madison, Ia.—The City will soon receive bids for paving streets at a cost of \$50,000. Address City Clk.

Grundy Center, Ia.—At a special meeting of the Council held Dec. 17, a resolution of necessity was introduced calling for the paving of the two business blocks of Main St., the street around the court house and the street to the depot. Part of this paving will be 60 ft. wide, part 40 ft. wide and part 30 ft. wide. Several kinds of materials are under consideration.

The Council is planning to pave many streets next year. Address City Clk.

Erle, Kan.—The Co. Comrs. of Neosho Co. have located a new road, which, when completed, will connect all the cities and towns in the county.

Kansas City, Kan.—An ordinance has been passed by the City Council levying special assessments to pay the cost of curbing and paving Freeman Ave., between Fourth and Fifth Aves.

Manhattan, Kan.—Bids will be received by the Co. Clk. of Riley Co., at Manhattan until Jan. 8, for constructing a rock road in Ashland Twp. Address George H. Hungerford, Co. Clk.

The Council will pave eight additional blocks with brick or asphalt. Address City Clk.

Topeka, Kan.—The City Comrs. have received petitions asking for the improvement of streets aggregating 75 blocks. It is stated that all petitions which have the requisite number of signatures will be granted.

A petition containing the signatures of 80 per cent. of the property owners on North Quincy St. from Fairchild St. to Garfield Park, was presented to the City Comrs. The petition asked for an asphalt pavement from Fairchild St. north to Garfield Park. The cost of paving the street, which is 30 ft. wide, is estimated at about \$60 per 20-ft. lot.

Baltimore, Md.—Twenty-seven miles of streets will be paved during 1913. Address R. K. Compton, Chmn. of Paving Comm.

Centerville, Md.—Sealed bids will be received by the Bd. of Co. Comrs. of Queen Anne Co. at Centerville until Dec. 31 for improving the following roads: Finger Board Rd., 1.92 miles, Stevensville Rd., .49 mile; Millington Rd., .78 mile.

Lansing, Mich.—The Council has appointed a Com. to decide the streets to be paved. Address J. E. Whitam, Chmn.

Minneapolis, Minn.—The Council has ordered several streets to be paved with creosote blocks. Address City Clk.

Norfolk, Neb.—An ordinance has been passed by the City Council creating paving Dist. No. 4. This means that North Fourth St. and South Fourth St. from the M. & O. tracks to the South Norfolk depot will be paved in the near future.

New York, N. Y.—The Quartermaster, U. S. A., at Ft. Totten, will receive sealed bids until Jan. 15 for the construction of macadam roads, cement walks, etc., at Ft. Totten.

Athens, O.—An ordinance has been passed by the City Council authorizing the levying of special assessments for the improvement of Depot St. from Union St. to a point 25 ft. south of Foster's north line of premises in out-lot No. 106, by draining, grading, curbing and paving the same with brick or block, and to issue bonds in anticipation of the collection of special assessment therefor.

Cleveland, O.—Sealed proposals will be received at the office of the Bd. of Comrs. of Cuyahoga Co., until 11 a. m., Jan. 15, 1913, for the improvement of Usher Rd., from Irish Rd. to the village line in Olmsted Twp., in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Co. Surv. John F. Goldenbogen is Co. Clk.

The following ordinances have been passed by the City Council: Determining to proceed with the improvement of Bristol Ave. S. E. from E. 79th St. to E. 81st St., by grading, draining, curbing and paving. Determining to proceed with the improvement of Herschel Court S. W., from W. 5th St. to W. 7th St., by grading, draining and paving. Determining to proceed with the improvement of Perkins Ave. N. E. from E. 35th St. to the east line of E. 37th St., by grading, draining, curbing and paving. Determining to proceed with the improvement of Western Ave. N. W., from W. 100th St. to W. 106th St., by grading, draining, curbing and paving.

Elyria, O.—The Council is planning to pave several streets. Address City Engr.

Hamilton, O.—The Council is planning to advertise for bids for paving certain streets about May 1. Address Engr. Weaver.

Jefferson, O.—The Council is planning to pave several streets. Address City Clk.

Sandusky, O.—Ordinances have been passed by the City Council authorizing the following: Resurfacing First St. with asphalt or brick, paving Central Ave. from Madison Depot St. to Monroe St. and from Madison St. to Decatur St.; issuing bonds to the amount of \$19,000 to pay the cost of above improvements.

Steubenville, O.—The Co. Comrs. of Jefferson Co. will receive bids until noon, Jan. 3 for the improvement of the Bantam Free Tpke. Rd., Cross Creek Twp. The road is 17,787 ft. long.

Toledo, O.—An ordinance has been passed to provide for the issue of bonds to pay for the improvement of Heston St. No. 1.

An ordinance has been passed to provide for the issue of bonds to pay the improvement of Utah St. Address John M. Babcock, Clk. of Council.

An ordinance has been passed to provide for the issuing of bonds of the City of Toledo in the sum of \$175,000 for the purpose of purchasing and condemning the

necessary lands for parks, park entrances, parkways and boulevards and for improving the same, and completing improvements on existing boulevards and parks, being part of the issue of bonds authorized by a vote of the electors of the city of Toledo on Nov. 5, 1912. Address John M. Babcock, Clk. of Council.

Scranton, Pa.—The Council is planning to pave several streets. Address Ellsworth Kelly, City Aud.

Dillon, S. C.—Thirty thousand dollars will be spent for road improvement in Dillon Co., Edwin M. Wayland is Co. Engr.

Sioux Falls, S. D.—The City Engr. has been directed to prepare plans for paving to be done. Address City Engr.

Belton, Tex.—Plans are on foot for the laying of a concrete walk on the west side of Penelope St. from the corner of the postoffice, on Central Ave. N., to connect with the new walk put in by the M. K. & T. Also a section north of the walk laid by the Katy extending to Santa Fe Ave. It is also expected that a walk will be laid around the Methodist church property.

Bryan, Tex.—A movement has been started toward paving the main street of Bryan on the co-operative plan. The city will pay one-third and the property owners on each side of the thoroughfare will pay one-third.

Hillsboro, Tex.—The city of Hillsboro will receive written bids for certain sidewalk improvements to be done on East Elm and East Franklin Sts. in the city, said work to be done according to the plans and specifications now on file with the City Sec. Bids must all be deposited with the City Sec. by 6 p. m., Jan. 7, 1913. Gus Cliett is City Sec.

Houston, Tex.—Sealed proposals will be received at the office of Dan C. Smith, Jr., City Sec., until noon, Dec. 30, 1912, for the grading and paving of Anita St., from the west line of Main St. to the east line of Baldwin St., with bitulithic pavement in accordance with the specifications adopted by the City Council. Address H. B. Rice, Mayor.

The Co. Comrs. of Harris Co. have agreed to appropriate \$9,000 as the county's share of the expense of paving with asphalt Harrisburg Rd. between Milby St. and the eastern limits of the city.

Jefferson, Tex.—Plans are now under way for eight blocks of city paving, and work is expected to start in the early spring. Creosoted block will be used.

Marshall, Tex.—Sealed bids will be received by H. S. Rice, City Secy., until Dec. 31 for the construction of approximately 9,000 sq. yds. of paving. Bids will be received on concrete, asphalt macadam and plain macadam. E. L. Dalton is the Engr.

Terrell, Tex.—A movement is on foot to have the city improve Griffith Ave. by curbing and paving with crushed rock.

Richmond, Va.—The Barton Heights Town Council has decided to grade and improve four blocks of Robert St.

Milwaukee, Wis.—The Comrs. of Pub. Works plan to pave 56 miles of city streets in the year 1913. Address Clk. of the Bd.

Racine, Wis.—Property owners on Superior St. have petitioned the Common Council to have that street paved. Property owners on Quincy Ave. have filed a similar petition.

Freeholders of the city of Racine have petitioned the Common Council to have Michigan St., between Third and Fourth Sts. widened five ft. along the west line.

Oshkosh, Wis.—City Engr. George H. Randall has prepared plans for paving streets. The materials to be used are sarcolithic, cedar block, cement, etc. Address City Engr.

Bids Received and Contracts Awarded.

Fresno, Cal.—John Hannafin of Fresno was awarded a contract for the grading of 19½ miles of streets in Biola, near Fresno.

Hermosa Beach, Cal.—The Barber Asphalt Paving Co. was the only bidder and was awarded the contract for improving Second St. at 22c. per sq. ft. for asphalt paving, 31.3c. for macadamizing, 15c. for sidewalks, 30c. per lin. ft. for curbs, 12c. per lin. ft. for pine curbs.

The following bids were received by the Bd. of Trustees for the improvement of various streets in this city. Johnson-Shea Co. of Riverside, were the low bidders at \$102,336.96. H. H. Peterson of Imperial bid \$127,336.39. The itemized bids were: Johnson-Shea Co., 3c. per sq. ft. for grading, 35c. per lin. ft. for cement curb, 24c. per sq. ft. for class A paving, 20c. per sq.

ft. for class B paving; H. H. Peterson, 4c. for grading, 35c. for curb, 24c. and 22c. for paving. The estimated quantities of work to be done are as follows: 565,007 sq. ft. of grading, 253,892 sq. ft. of class A paving, 187,069 sq. ft. of class B paving, 14,108.2 lin. ft. of cement curb. I. B. Funk is City Engr.

Los Angeles, Cal.—I. L. Fetterman 745 West Sixth St., Long Beach, has been awarded a contract for improving a portion of the Wilmington and San Pedro Rd. at 35c. per cu. yd. for embankment, 10c. per sq. ft. for paving, 40c. per sq. ft. for shoulders, \$2 per lin. ft. for culverts.

J. M. Montgomery of Alhambra, has been awarded the contract for improving Ave. 64 from Pasadena Ave. to the north city limits at 17½c. per sq. ft. for asphalt paving; 30c. per sq. ft. for vitrified block gutter; 40c. per sq. ft. for granite block gutter; \$1,950 for storm drains and appurtenances, complete. Aggregate, \$10,959.75.

The Barber Asphalt Paving Co. has been awarded a contract for improving Sunset Blvd. from Normandie Ave. to Hollywood Blvd. at 21 6-10c. per sq. ft. for asphalt paving, 15 8-10c. per sq. ft. for macadam repaving, \$1 per lin. ft. for grading, graveling and oiling in Vermont Ave.; \$3 per lin. ft. for grading, graveling and oiling in Edgemont St.; \$3 per lin. ft. for reggrading, reggrading and reoilng on Normandie Ave.; 35c. per lin. ft. for cement curb; 12c. per sq. ft. for cement sidewalk; 36-in. concrete curb and gutter; 17,250 sq. yds.; 48 6-10c. per sq. ft. for granite block gutters; 20 7-10c. per sq. ft. for cement gutters, and \$6,015 for culverts; total, \$74,564.35.

Tampa, Fla.—The contract for the paving of Lamar St. has been awarded by the Comrs. of Pub. Wks. to R. L. Davis at \$2.14 per sq. yd. for asphalt blocks.

The contract for laying sidewalks on various streets has been awarded to J. L. Roumillat at 14c. per sq. yd.

Rome, Ga.—Contract for street work has been awarded to the Southern Asphalt & Const. Co. of Birmingham, Ala., at \$38,401. The contract calls for the following quantities: 3,250 lin. ft. granite curb; 1,350 lin. ft. curb to reset; 4,603 lin. ft. 6x30-in. concrete curb and gutter; 2,150 lin. ft. 8x36-in. concrete curb and gutter; 17,250 sq. yds. 5-in. concrete foundation; 14,810 sq. yds. 2-in. sheet asphalt surface; 2,440 sq. yds. vitr. brick track surface, and 30 cu. yds. extra concrete.

Peoria, Ill.—The contract for paving Brotherson St. has been awarded to McElwee & Bushnell at \$6,653.

Noblesville, Ind.—The following contracts have been awarded by the Co. Comrs. of Hamilton Co. for the construction of gravel roads: The Beals Rd. to Applegate & Wiles at \$5,593; the Kinzer Rd. to T. E. Ramsey at \$7,902.

Louisville, Ky.—The Bd. of Park Comrs. has awarded the contract for the extension of Eastern Parkway from Shelby to Floyd Sts., to the Henry Bickel Co. at approximately \$12,000.

Salisbury, Mass.—The contract for the construction of the boulevard between Salisbury and the N. H. state line, a distance of 4 miles, has been awarded to David Watkins of Amesbury, Mass., at \$12,000.

Freehold, N. J.—The contract for the construction of the third section of the Holmdel-Red Bank gravel road has been awarded by the Bd. of Freeholders of Monmouth Co. to the Monmouth Contr. Co. of Red Bank at \$6,661.

Lumberton, N. J.—The contract for the construction of 1½ miles of shell road between Lumberton and Mt. Holly, has been awarded by the Twp. Com. to N. E. Austin of Lumberton at \$5,846.

Chillicothe, O.—The Co. Comrs. of Ross Co. have awarded the contract for graveling 100 rods of the Potts Hill Rd., Paxton Twp., to T. F. Campbell at \$170 per rod.

Youngstown, O.—The following contracts for paving have been awarded by the Bd. of Control: Franklin Ave., Miller Bros., at \$12,486; Empire and McKinnie Sts., Patrick Mylott at \$592 and \$7,492.

Dallas, Tex.—The following contracts have been awarded for paving: Terminal St., bitulithic, Texas Bitulithic Co., at \$13,586; Carroll Ave. with bituminous macadam, Roach, Manigan Co., at \$17,694.

El Paso, Tex.—The Government Hill Co. has awarded the contract for that portion of the hill west of Fort Bliss to the Texas Bitulithic Co. at \$40,000.

South Vancouver, B. C.—The City Council has awarded the contract for paving Westminster Rd. with creosoted wood block to V. L. MacAdam & Co. of Vancouver at \$227,148.

BRIDGES.

Bids Asked and Prospective Work.

Birmingham, Ala.—The Co. Bd. of Revenue of Jefferson Co. will soon advertise for bids for the construction of a bridge over the tracks of the L. & N. and the Southern Ry. Co. near North Birmingham.

Fresno, Cal.—The Bd. of Spvs. of Fresno Co. has authorized Spvr. Jorgenson to build a reinforced concrete bridge, 30 ft. long, near Malaga.

Washington, D. C.—Sealed bids will be received by the Bureau of Yards and Docks, Navy Dept., Washington, until 11 a. m., Jan. 4, for the construction of a combined highway and railway bridge, material concrete and steel, length 300 ft., 4 spans, at the Navy Yard, Portsmouth, N. H.

Danville, Ill.—A petition signed by 103 citizens of South Homer Twp. and 75 citizens of Vance Twp. has been presented to the Bds. of Spvs. of Vermillion and Champaign Cos. for a bridge across the creek on the county line road three miles northeast of Homer.

Albion, Ind.—The Bd. of Co. Comrs. of Noble Co. will receive sealed bids until 10 a. m., Jan. 8, for the construction of a concrete arch bridge, 90 ft. span across the Elkhart River at Ligonier. Address T. C. Kimmel, Co. Aud.

Ft. Wayne, Ind.—The Bd. of Pub. Works is planning to build two annexes to the St. Marys river bridge. Address E. J. Lennon, Clk. of the Bd.

Indianapolis, Ind.—The Bd. of Park Comrs. has approved plans and specifications for the construction of a new bridge over Crooked Creek north of Riverside Park. The bridge will be a single concrete span of 70 ft. and will cost about \$22,000.

Waverly, Ia.—At the regular January session of the Bd. of Spvs. of Bremer Co., proposals will be received for the building of all slough, truss concrete combination and iron bridges built in Bremer Co. for the year 1913, after the iron, steel, lumber, cement, and all other material has been purchased, by the Bd. of Spvs. Address W. H. Pockels, Co. Aud.

Atchison, Kan.—The proposed viaduct over the Missouri Pacific and Santa Fe tracks must be built at Fourteenth St. The viaduct will be 1,000 ft. long and will be of steel. Address Mayor Walker.

Manhattan, Kan.—Bids will be received Jan. 9 for the construction of a 16-ft. concrete bridge at Meismeyer's crossing, Swede Creek Twp. Also a 12-ft. concrete top bridge at Richter's crossing, Center Twp. Plans and specifications are on file in the office of George H. Hungerford, Riley Co. Clk.

Smith Center, Kan.—The Smith Co. Bd. will receive bids Jan. 8 for bridge work required during the coming year. The work includes repairs of wood bridges, replacing steel joists, furnishing steel span and erecting steel bridges. John E. Merriam, Co. Clk.

Winfield, Kan.—The Cowley Co. Comrs. have arranged for the building of a new bridge on the county line road across Rock creek, northeast of Rock. It will be a stone or concrete arch of 40-ft. span. Address Co. Engr.

Thief River Falls, Minn.—Sealed bids will be received by the Co. Comrs. of Pennington Co. until Jan. 8 for the construction of a steel bridge over the Thief River in Thief River Falls. Bids will be received for one span of 120 ft. or for two spans of 100 ft. A. H. Fasel is Co. Aud.

Hattiesburg, Miss.—The Bd. of Spvs. adopted plans and specifications of the Converse Bridge Co. for four steel bridges to be built over the streams in Forrest Co. Bids for building of the bridges will be opened in January at the regular meeting of the Board. The other bridges had been contemplated, but as they are on the highways for which the recent bond issue was made, the board will leave them to the Rd. Comrs. Address Mr. Draughn.

Cape May, N. J.—The Bd. of Freeholders of Cape May Co. has adopted a resolution declaring it necessary to build a bridge from Beesley's Point to Somers Point and directed Clerk Fowkes to so notify Gov. Wilson, State Highway Comr. Stevens and the Atlantic Co. Bd. of Freeholders so that their co-operation may be secured, and a meeting arranged.

New Brunswick, N. J.—The Bd. of Freeholders of Middlesex Co. will receive bids until Jan. 2 for the construction of 2 concrete and steel bridges. One will be built at Amboy Ave., Woodbridge Twp. over

Herd's brook, and the other over the north branch of the Rahway River on the Menlo Park-Iselin Rd. A. B. Fox is Co. Engr.

Ocean City, N. J.—The Ocean City Auto Bridge Co. will receive bids until 1 p. m., Jan. 4, for the construction of a trestle and highway bridge and roadway from Ocean City to Somers Point. The length of the structure will be 6,000 ft. Address R. L. Goff, Engr. in charge.

Trenton, N. J.—City Engr. of Streets Swan has plans ready to submit to the engineers of the Pennsylvania Railroad Co. for the new canal bridges to be constructed at Prospect St. and Willow St.

Cleveland, O.—Sealed proposals will be received at the office of the Bd. of Comrs. of Cuyahoga Co., until 11 a. m., Jan. 5, 1913, for the construction of bridge work, including sidewalk and curb, South Rockly River bridge, Rockport Twp., in accordance with the form of contract and specifications to be furnished by Frank R. Lander, Co. Surv. John F. Goldenbogen is Co. Clk.

Springfield, O.—Sealed proposals will be received by the Co. Comrs. of Clark Co. at Springfield until Jan. 23 for the construction of two bridges, one over Beaver Creek east of Springfield at an estimated cost of \$5,000 and the other over Donnell's Creek on the Carlisle Pike, west of the city, at an estimated cost of \$5,500.

Durant, Okla.—The citizens recently held a mass meeting and stock was subscribed to build a bridge over Red River, between Durant and Denison. Address City Engr.

Wampum, Pa.—A bridge is to be constructed connecting Wampum and Chewton. Address Boro. Clk.

Philadelphia, Pa.—Director of Pub. Works Cooke has announced that specifications have been prepared for repairing the bridge over the P. R. R. tracks at 40th St. Bids will be asked soon. The estimated cost is \$15,000.

Providence, R. I.—Repairs upon the South Water St. side of Crawford St. bridge which will entail an expenditure of between \$12,000 and \$13,000 will be made early next spring by the city Pub. Works Dept. Address Clk. of the Bd.

Woonsocket, R. I.—A resolution has been passed by the Common Council providing for the appropriation of \$25,000 for the construction of a concrete arch bridge over the railroad tracks at Harrison Ave.

Walla Walla, Wash.—Bids will be received Jan. 2 by the Walla Walla Co. Comrs. for furnishing all material and labor necessary for the construction of a steel 100-ft. span and piers. Separate bids will be required on the piers and superstructure. Address Clk. of the Bd. of Co. Comrs.

Milwaukee, Wis.—Preliminary plans for the new bascule bridge at Buffalo St. were submitted to the War Department at Washington, following approval by the Comr. of Pub. Works. The new structure will cost in the neighborhood of \$175,000. Address City Surv.

Winnipeg, Man.—Plans are being prepared for a proposed bridge at Arlington St. There are to be three spans, a main and two smaller, and the width is given as 50 ft. The cost is estimated to be \$100,000. Address City Clk.

Bids Received and Contracts Awarded.

Troy, Ala.—The Bd. of Comrs. of Pike Co. has awarded the contract for the construction of a bridge across the Conecuh River to the Converse Bridge Co. of Knoxville, Tenn.

Modesto, Cal.—The Bd. of Spvs. has awarded the contract for the construction of a bridge over the main canal of the Modesto Navigation District to T. K. Beard at \$3,331.

The contract for the construction of a bridge over lateral No. 5 has been awarded to Ulrich & Howell at \$1,800.

Washington, D. C.—The contract has been awarded by the Dept. of the Interior for the construction of a bridge across the Little Big Horn River, Crow Indian Reservation, Mont., to A. Y. Bayne & Co. of Minneapolis, Minn., at \$7,760.

Kansas City, Mo.—The contract for the widening of the Main St. steel viaduct has been awarded by the Bd. of Pub. Works to the Midland Bridge & Const. Co. of Kansas City, as follows: Removal of all portions of present viaduct necessary to widen structure and change grades, \$12,000; 239,000 lbs. structural steel, 4.6c.; 126,000 lbs. reinforcing bars, 3.5c.; 14,000 lbs. metal in gas pipe handrail, 6.5c.; 2,910

sq. ft. 4-in. concrete sidewalk, 15c.; 1,070 lin. ft. concrete curb, 6x10 in., 50c.; 400 cu. yds. reinforced concrete, \$13.50; 2,700 cu. yds. earth fill between retaining walls, \$1; 305 lin. ft. reinforced concrete handrail, including placing of lampposts thereon, \$3; 1 M. ft. b. m. timber handrail, \$50; 430 cu. yds. excav., 75 cts.; 210 lin. ft. concrete curb, 6x2 in., \$1; 1,000 lin. ft. conduit for lighting system, 15c.

Charlotte, N. C.—The Bd. of Co. Comrs. has let to the Requarth Construction Co. of Charlotte, the contract for building a new 300-ft. concrete bridge over Paw Creek, nine miles from the city on the Dowd Rd. The contract price was \$8,100.

Cincinnati, O.—The Bd. of Co. Comrs. of Hamilton Co. has awarded the contract for the construction of a culvert on the Foley Rd. near Trenton Ave., Delhi Twp., to Theodore Cornelle of Madisonville, O., at \$8,552.

BONDS.

Cadiz, Ky.—An election will be held Jan. 25 to decide the question of issuing \$150,000 of Trigg County road bonds. Address County Judge John C. Dabney.

Pineville, Ky.—An election will be held in Bell Co., March 4, to vote on the proposition of issuing \$350,000 in road bonds.

Iowa City, Ia.—Fifty-five thousand dollars in paving bonds will be issued. Address City Clk. Reddick.

Springfield, O.—The Co. Comrs. of Clark Co. will sell bridge bonds amounting to \$105,000 on Jan. 15.

MISCELLANEOUS.

Venice, Cal.—Braun, Bryant & Austin have been granted a permit for the construction of a cement and asphalt plant to cost \$18,000.

Jacksonville, Fla.—The following contracts have been awarded for furnishing road building machinery, deliveries to be made f. o. b. Jacksonville: To the Chicago Concrete Machinery Co., Atlanta, Ga., one concrete mixer on truck with steam engine, \$2,000; Ohio Road Machinery Co., Oberlin, O., one road machine complete, \$252; The W. E. Austin Machinery Co., Atlanta, Ga., one stone crusher complete, with elevator, bin and screen, and with 14-h.p. gasoline engine, \$1,500, and to the Kelly-Springfield Road Roller Co., one 7-ton tandem roller with steam engine complete, \$2,250.

Manila, P. I.—Sealed bids will be received at the office of the Purchasing Agt., Bureau of Supply, Manila, until Jan. 15, and at the office of the Insular Purchasing Agt., Bureau of Insular Affairs, 17 Battery Pl., New York City, until Jan. 14, for furnishing the fabricated steel and field rivets for 2 spans at 90 ft., one span at 100 ft. and one span at 90 ft. for Neuva Ecij bridges, 7 spans at 160 ft. for the Savag bridge, Ilocos Norte and one span at 160 ft. for the Rugas bridge.

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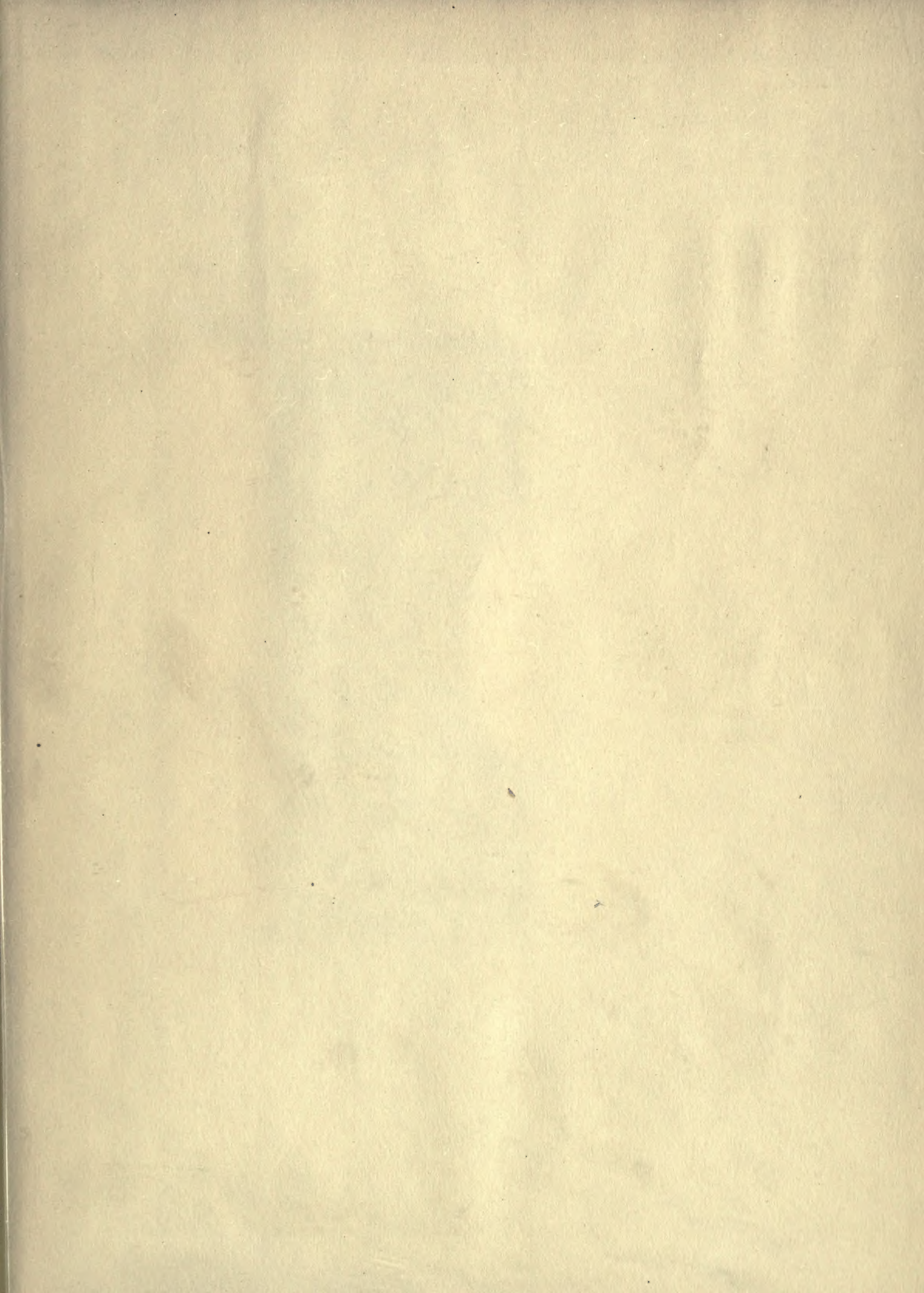
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